Disease prevention in commercial layers

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A good layer begins with a good quality pullet. Pullets having the correct bodyweight and body type at the start of egg production will best be able to achieve the genetic potential of the variety. Problems fostered during the growing period cannot be corrected after egg production begins. This article outlines the components of a good pullet development programme.

Brooding

The first 7-10 days of life sets the course of the flock for the entire rearing period. Significant losses can occur during this time. The newly hatched chick is unable to regulate its body temperature, and must be given an environment with the proper temperature and humidity.

Brooding birds in cages requires stricter management of temperature and humidity because the chicks cannot migrate to an area of comfort like floor grown chicks.

Chicks brooded in cages should be placed on paper for the first 7-10 days to help with temperature control, prevent drafts and allow supplemental feeding on the paper.

In the first hours after placement in cages, the chick must rapidly adapt to its new environment and learn to use feeders and drinkers.

Placing feed on the cage paper, increasing the light intensity and activating the drinkers helps with this adaptation. Chicks that fail to adapt will die at four or five days of age, when the yolk sac is depleted.

Humidity of the air should be 40-60% during the first week to prevent drying of the mucus membranes of the respiratory tract.

Body weight management

Pullet body development occurs according to a well orchestrated sequence of events. Pullets must attain the proper body development and weight at the time of sexual maturity to perform well as layers.

Age (days)	Cage brooding (°C)	Floor brooding (°C)
1-3	35-37	35
4-7	32-34	33
8-14	29-31	31
15-21	26-29	29
22-28	24-26	26
29-35	12-23	23
36	21	21

Table 1. Brooding temperatures for Hy-Line brown pullets.

It is difficult to achieve good productivity in underweight or overweight pullets. We can divide the growing period into three phases.

- **0-6 weeks of age.**

During this period, the organs of the digestive tract and the immune system undergo much of their development. Problems during this period have permanent negative effects on these systems.

Coccidiosis and infectious bursal disease can affect pullets during this time. Birds stressed during this period will have lifelong disability in digestion/absorption of feed nutrients. Permanent immunosuppression can result from problems during this period.

	Cage	Floor
Floor space	350cm²	1115cm²
Feeder space	8.0cm/bird	8.0cm/bird 1 pan/20 birds
Water space:		
Trough	3.0cm/bird	3.0cm/bird
Cups/ nipples	1 per 8 birds	1 per 8 birds
Fountains	–	1 per 50 birds

Table 2. Growing space recommendations for brown pullets.

- **6-12 weeks of age.**

This is the period of rapid growth when the pullet attains most of its adult stature. The structural components (muscles, bones and feathers) of the body develop.

The skeleton is 95% developed by the end of the 12th week. Any stressful events during this period can prevent the pullet from

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Fig. 1. Weekly growth for brown pullets.

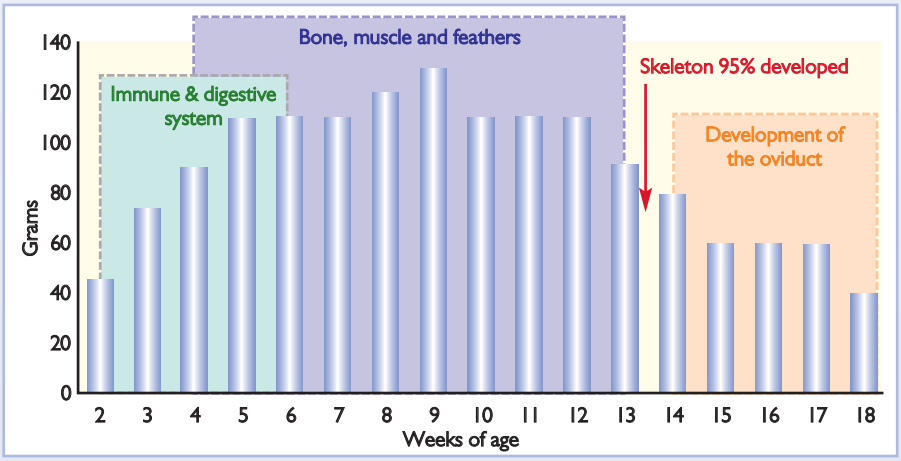

Table 3. Target weights of brown pullets.

Age (weeks)	Cage[1]	Cage-free[2]
1	70	70
3	190	160
5	390	330
7	620	540
9	860	760
11	1080	960
13	1250	1130
15	1370	1290
17	1470	1430
18	1500	1500

[1] *Hy-Line Variety Brown, Commercial Management Guide, 2005-2007*

[2] *Hy-Line Variety Brown, Commercial Management Guide, Alternative Systems, 2004-2005 (UK)*

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developing sufficient skeletal and body reserves needed to sustain a high level of egg production.

At this time the growth plates of the long bones calcify and no further increases in bone size can occur.

Any compensatory growth occurring after this period will not increase the size of the skeleton. Stressful vaccinations, beak trimming and other poor management practices should be avoided during this period of rapid growth.

● **12-18 weeks of age.**
The growth rate slows and the reproductive tract matures and readies itself for egg production.

Age	Hours of light	Minimum light intensity
0-3 days	24	10-20 lux
3 days to 3 weeks	18	5-10 lux
4 weeks	17	"
5 weeks	16	"
6 weeks	15	"
7 weeks	14	"
8 to 16 weeks	12	"
17 weeks*	13	10-20 lux
**Increase lights when flock reaches the 17 week target body weight (~1,470g) if flock is underweight, delay light stimulation by one week*		
18 weeks	13.5	10-20 lux
19 weeks	14	"
20 weeks	14.5	"
21 weeks	14.75	"
+15 minute light increases until a total of 16 hours is reached		

Table 4. A 'slow step down' lighting programme.

Low body weights and stressful events during this time can delay the onset of egg production. Infections with infectious bronchitis can result in oviduct damage, which negatively affects the reproductive potential of the hen.

Uniformity of the individual birds in a flock is as important as achieving the target average body weight. The goal for uniformity is for 80% of the individual bird weights to fall within 10% of the mean.

If a flock has poor uniformity and there are many underweight birds, it will be difficult to properly care for these small birds without compromising the other birds in the flock.

Reasons for poor pullet uniformity include the following:
- Diseases such as coccidiosis or Gumboro disease.
- Overcrowding leading to competition at the feeders and waterers.
- Inadequate nutrition or feed management. Not enough feedings or stimulations, slow movement of feeders.
- Stress from vaccination.
- Poor beak trimming technique.

In cases where the uniformity is poor it may be necessary to segregate the birds by weight and feed separately. Birds on the floor can be separated into pens of different weight classes. Where the birds cannot be separated, the flock should be fed according to the requirements of the lighter birds in the flock. A weight monitoring programme should begin when the flock is four weeks old. Birds should be weighed weekly during the growing period and every two weeks during the production period. At least 100 birds should be weighed.

For pullet flocks raised in cages, a selection of cages from all levels and positions in the house should be marked. All the birds in these cages should be weighed separately.

These same cages should be weighed every week. Select cages at the beginning and the end of feed lines, as well as from upper and lower levels.

Weekly monitoring of body weights allows the producer to identify more quickly when growth problems occur. It might be possible

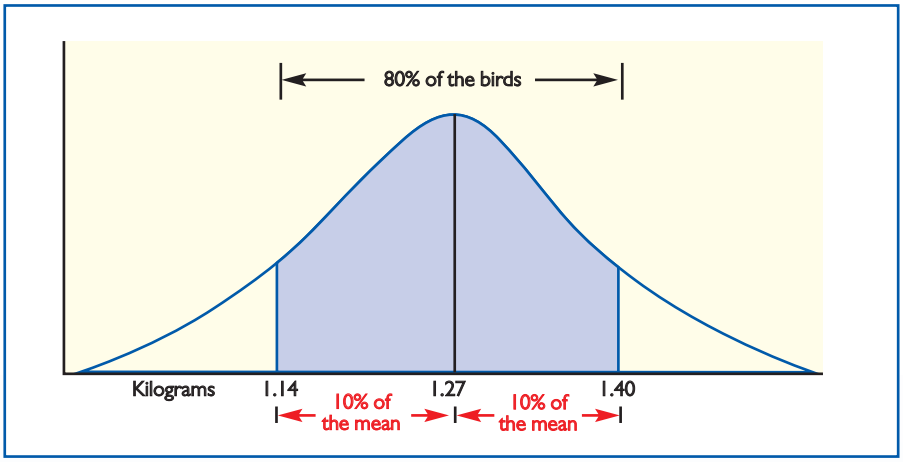

Fig. 2. Body weight uniformity.

to associate the growth problem with a change in feed or a stressful management practice, so corrective action can be taken.

Weigh birds prior to a scheduled change in feed formulation, such as the change from starter to grower feed. Scheduled changes in feed formulations should always be based on achieving target body weights and not the age of the flock. Underweight pullet flocks or flocks with poor uniformity should be retained on the more nutrient rich formulation.

Beak trimming

Beak trimming prevents cannibalism and feed wastage. Beak trimming early in the bird's life, at 6-10 days, causes the least amount of stress and negative effect on growth. The chick is growing at a relatively low rate during the first two weeks of life and recovers quickly from beak trimming during this time.

Beak trimming should be done with a precision beak trimmer using a cauterising hot plate maintained at 595°C.

The cauterization time is usually two seconds. Cauterisation time depends on blade temperature. Under cauterisation allows the beak to continue to grow in the form of sharp spurs, which might prevent the bird from eating properly, or cause serous injury to other birds.

Over cauterisation can result in sudden death of chicks, burnt tongues or the development of sensitive bulbs of nerve tissue (neuromas) at the end of the beak.

A template with guide holes of 4.00, 4.75 and 4.75mm, diameters holds the beak in the proper position. The proper size hole depends on the age and size of the chick. The correct hole provides the width of 2mm, between the nostrils and the cauterising ring.

After a proper beak trimming of the Hy-Line Brown at 6-10 days of age, it should not be necessary to beak trim later. If a second beak trimming is necessary, it should be done before seven weeks or after 12 weeks of age to avoid significant negative effects on growth.

Infrared beak treatment at the hatchery is emerging as an alternative to beak trimming with a hot blade. The treated portion of the

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beak does not fall off until about two weeks of age. Usually, a second beak trimming is not necessary in infrared beak treated pullets.

Lighting programmes

A 'slow step down' lighting programme promotes better pullet growth by providing more feeding time. The hours of light are gradually decreased over the first seven weeks until a stable photoperiod of 10-12 hours is reached. The slow 'step down' in lights provides the flock with additional feeding time.

In open housing, the artificial lighting programmes must complement the natural day length.

After the initial step down in lights over the first seven weeks, the artificial lights are set to the longest natural day length the flock will experience during the growing period. This will negate the influence that changes in natural day length would have on pullet development and the age of first egg.

Vaccination programmes

A vaccination programme should be designed to best meet the immunity needs of each flock. These needs will vary from one farm to the next depending on the diseases present, the severity of the field challenges, the management practices used, the type of bird (layer or breeder), and the physical facilities.

It is impossible to meet these many needs with a single fixed vaccination programme. Many vaccination programmes are being used successfully throughout the world.

The three basic elements of a vaccination programme are the vaccine strains used, the timing of the vaccinations, and the routes of vaccine administration. A typical vaccination programme for the Brown commercial layer is shown in Table 5.

Acceptable site for the administration of inactivated vaccines.

AGE	VACCINE	STRAIN	ROUTE
Hatchery	Marek's	HVT + SB1 Or HVT + Rispens (high challenge farms)	In ovo or subcutaneous neck
14 days	IBD	Intermediate or intermediate plus	Drinking water
	Newcastle/bronchitis	B1B1 Mass and/or Conn, Holland	
28 days	IBD	Intermediate or intermediate plus	Drinking water
	Newcastle/bronchitis	B1B1 Mass, Conn, Ark, Holland (H120)	
32 days	IBD	Intermediate or intermediate plus	Drinking water
6 weeks	Newcastle/bronchitis	B1B1 Mass, Conn, Ark, Holland (H120), other regional strains	Course spray
10 weeks	Pox/avian encephalomyelitis	Fowlpox + pigeonpox/Calnek	Wingweb
	Laryngotracheitis	—	Eyedrop
	Mycoplasma gallisepticum (live)	6/85 Intervet	Fine spray
		TS-11 Merial	Eyedrop
12 weeks	Newcastle/bronchitis	B1B1 or La Sota Mass, Conn, Ark, Holland (~H75), other regional strains	Medium spray
16 weeks	Newcastle/bronchitis (inactivated)	La Sota Mass, Conn, Holland, Ark	Subcutaneous or intramuscular injection
		OR	
Every 8-12 weeks for duration of the laying period	Newcastle/bronchitis (live)	B1B1 or La Sota Mass, Conn, Ark	Medium or fine spray
		OPTIONAL VACCINATIONS DEPENDING UPON NEED:	
10 and 14 weeks	Haemophilus paragallinarum (inactivated)	A, B, C	Subcutaneous
10 and 14 weeks	Pasteurella (inactivated)	1, 3, 4, 3 x 4, or local serotypes Subcutaneous	Subcutaneous
16 weeks	EDS (inactivated)	EDS 76	Subcutaneous

Table 5. Typical vaccination programme for the Brown commercial layer.

The technique used to deliver vaccine to the flock is critical in achieving the desired level of immunity.

Vaccinations with live vaccines through the birds' drinking water or by spray are excellent methods of delivering vaccine to large numbers of birds but many problems occur with inadequate vaccination technique. Birds not exposed to vaccine or receiving inadequate vaccine to elicit a good immune response are the most common problems associated with vaccine administration.

Monitoring the flock's antibody response is useful in evaluating the vaccination programmes.

Immunosuppression caused by poor management, malnutrition, heat stress or diseases that damage the immune system limit the ability of a bird to respond to the vaccinations it is given.

Marek's disease, infectious bursal disease and Newcastle disease can be significantly immunosuppressive.

Vaccination of birds while they are sick, malnourished or under environmental stress will not result in the desired level of immunity. ■