Making genetics work – part two

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Genetic selection for layers in community cages has resulted in some commercial varieties with little propensity for pecking and cannibalism. Beak trimming is still advisable in open housing and to reduce feed wastage. Beak trimming at 7-10 days of age causes less stress and has less negative effect on growth compared to beak trimming older pullets.

Beak trimming should be done using a precision beak trimmer that uses a cauterising blade maintained at 595°C.

The cauterisation time is usually two seconds. Cauterisation time depends on blade temperature.

Under-cauterisation allows the beak to continue to grow often in the form of sharp points, which might prevent the bird from eating properly, or be injurious to other birds.

Over-cauterisation results in the growth 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 selection of guide hole diameter depends on the age and size of the chick. The goal is to leave 2mm between the nostril and the cauterised beak tissue.

The need for a second beak trimming depends on the commercial variety and the housing (open sided versus light controlled). Brown varieties usually require two beak trimmings in open sided houses. Some commercial varieties have more tendencies for pecking and cannibalism and will require two beak trimmings. Second beak trimmings should be done before six weeks or after 12 weeks of age to avoid significant negative effects on pullet growth and development.

In light controlled housing a second beak trimming should not be needed for most commercial white egg varieties, but always follow the breeder's recommendations for beak trimming.

Infrared beak treatment at the hatchery is an alternative to beak trimming with a hot blade. The infrared treated portion of the beak does not fall off until about two weeks of age.

The beak trim provided by infrared treatment is usually mild. High early mortality can occur from infrared beak treatment of chicks derived from young breeder flocks.

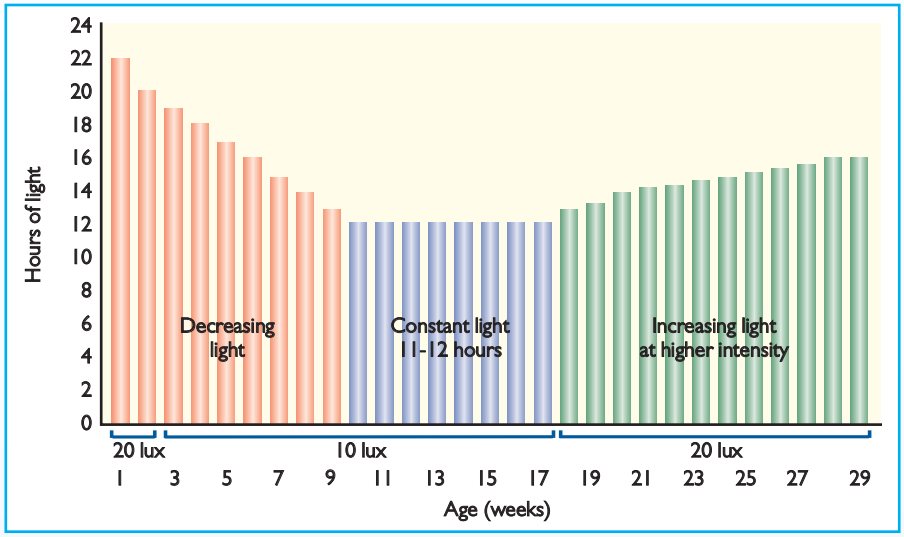
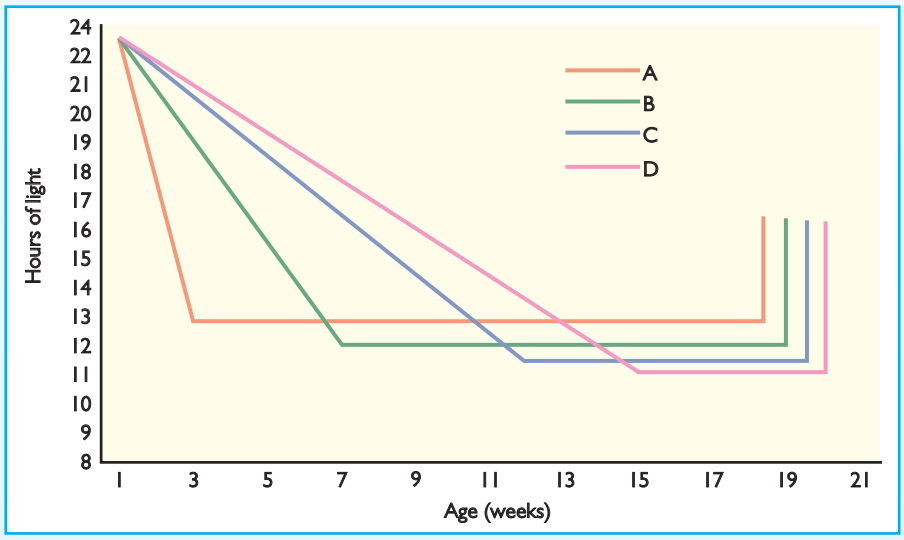


Fig. 2. Slow step down in light hours provides more feeding time.

Fig. 1. Effect of different lighting programmes on the age of first egg and egg size. A and B: Normal sexual maturity and egg size. C: Seven day delay in sexual maturity, 1g more egg weight. D: 10 day delay in sexual maturity, 2g more egg weight.



Lighting programmes

Lighting is an important aspect of the pullet rearing programme and can be used to maximise body weight gains and manipulate the age of first egg, egg weight and egg numbers.

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● **Wavelength.**

Not all light sources are of the same colour or wavelength. Research has shown varying effects of wavelength on bird performance.

Light sources emitting the blue-green spectrum results in the better bodyweight gains in growing birds. Light sources emitting the red-orange spectrum stimulates egg production.

For most poultry applications, a broad spectrum light source that simulates natural sunlight is probably best. Incandescent bulbs and warm fluorescent lights are acceptable.

● **Light intensity.**

Intensity of light in the layer house has to be equal or higher than the grower house. Growing and laying housing styles should preferably be matched so that light intensity can be properly managed.

In light controlled housing, it is recommended to provide 5-10 lux minimum to growing pullets and 10-20 lux minimum in lay. Avoid growing pullet flocks in open housing and moving them to closed, light controlled houses.

● **Standard artificial lighting programme.**

During the first three days the flock should be given 23 hours of light at 20 lux. Bright lights help the chicks find feed and water and adapt to their new cage environment. It is important to give the chicks at least a short dark period from the first day to habituate them to darkness.

Beak trimming should be done using a precision beak trimmer that uses a cauterising blade maintained at 595°C.

On the fourth day the light intensity can be reduced to 5-10 lux minimum. The light hours are gradually decreased over the next seven weeks until reaching a constant 11-12 hours photoperiod or matching the natural light in open housing.

The natural day length varies according to the latitude. 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 that will occur during the growing period.

This negates the influence that changes in natural day length would have on pullet development and the age of the first egg. A knowledge of the variation in the natural photoperiod is essential information when you are designing artificial lighting programmes.

● **Lighting programme to promote better pullet growth.**

To promote higher feed consumption and better growth in pullets, the lights can be reduced more slowly as shown in Fig. 1 in lighting programme B (seven week step down), C (12 week step down) and D (15 week step down).

A slower decrease in light hours provides the pullet flock with additional feeding time and improves pullet growth.

This can be particularly useful in the hot weather months when bird appetite is usually less.

● **Lighting programme to maximise egg size.**

If our management objectives are to maximise egg size, even at the expense of some loss of egg numbers, we can use a slow step down lighting programme (C and D) to accomplish this. Any declining day length after 12 weeks of age in the pullet house will tend to delay the sexual maturity of the flock.

● **Lighting programme to maximise egg numbers.**

If the management objective is to obtain maximum egg numbers, and egg size is relatively unimportant, then we can use the reverse philosophy and provide early light

stimulation to bring the flock into production at lighter body weights.

Here we would want to avoid any step down lighting after 12 weeks of age and start light stimulation as early as 16 weeks of age.

The age at maturity is not always proportional to age of stimulation, as the birds still have to attain a certain body weight before they will respond to lights, but by light stimulating early, we should get egg production 7-10 days earlier than normal.

The egg size will be smaller by early light stimulation. Under most circumstances the ideal time to stimulate pullets with light is when they have reached their ideal bodyweight as determined by the breeder's standard.

The light stimulation should begin when the average bird bodyweight is at or above the breeder's target, usually 17-18 weeks of age.

The initial increase in light should be one hour, followed by two 30 minute increases, thereafter 15 minute increases. Light stimulation ends when a maximum of 16 hours is reached.

The light intensity should be increased to a minimum of 10-20 lux. Ideally, the light stimulatory phase should last until the flock has reached the peak egg production (about 25 weeks).

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 varied needs with a single fixed vaccination programme.

Many vaccination programmes are being used successfully throughout the world. Local veterinary expertise should be consulted when devising a vaccination programme.

A typical US vaccination programme for commercial layers is shown in the box right.

Conclusion

Getting the most out of layer genetics requires close adherence to the management and nutritional recommendations of the primary breeder. Growing a good quality pullet is the first and most important step in profitable egg production.

Many egg production and shell quality problems encountered in laying flocks can be traced back to failures in pullet development.

The bodyweight at the age of first egg sets the egg weight curve for the laying period, and should be maximised to realise the genetic potential. ■

A TYPICAL US VACCINATION PROGRAMME FOR COMMERCIAL LAYERS

Age	Vaccine	Strain	Route
Hatchery	Marek's	Rispens or HVT + Rispens	Subcutaneous neck
15 days	IBD Newcastle/ bronchitis	Intermediate B1B1 Mass, Conn, Holland	Drinking water
28 days	IBD Newcastle/ bronchitis	Intermediate B1B1 Mass, Conn, Ark, Holland (H120)	Drinking water
32 days	IBD	Intermediate	Drinking water
6 weeks	Newcastle/ bronchitis	B1B1 Mass, Conn, Ark, Holland (H120), other regional strains	Spray ~ 100 microns
10 weeks	Pox/avian encephalomyelitis Mycoplasma gallisepticum (live)	Fowlpox + pigeonpox/Calnek 6/85 Intervet TS-11 Merial	Wingweb Fine spray Eyedrop
12 weeks	Newcastle/ bronchitis	B1B1 or La Sota Mass, Conn, Ark, Holland (~H75), other regional strains	Spray ~ 80 microns
16 weeks	Newcastle/ bronchitis (inactivated)	La Sota Mass, Conn, Holland, Ark	Subcutaneous or intramuscular injection
	OR		
Every 8-12 weeks for the duration of the laying period	Newcastle/ bronchitis (live)	B1B1 or La Sota Mass, Conn, Ark	Medium or fine spray

Optional vaccinations depending upon need:

Age	Vaccine	Strain	Route
10 and 14 weeks	Laryngotracheitis (ILT)	Chick embryo or tissue culture	Eyedrop
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
16 weeks	EDS (inactivated)	EDS 76	Subcutaneous/IM
10 and 16 weeks	Turkey rhinotrachetis (pneumovirus) (inactivated)	A, B	Subcutaneous/IM