

# The importance of quality nutrition and management on the breeder farm

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The quality of the day-old chicks is crucial for the success of a layer hatchery. Different approaches to judge chick quality have been proposed in literature and implemented in practise. Today there is no universal procedure available to judge chick quality and the assessments are often difficult to quantify, to interpret and to compare.

There are different chick quality criteria which can be measured in the hatchery: for example chick weight, chick length, chick yield, residual yolk weight; visual parameters like chick activity, navel quality, general appearance, belly size, and in the rearing farm: chick weight at housing, chick weight after the first week and first week mortality.

## Chick weight and mortality

While some of these criteria are more meaningful in terms of controlling procedures within the hatchery, like for example chick yield, others are very important for the day-old chick customers. A regular point for discussion is the first week mortality and also sometimes chick weight.

To what extent do the breeders play a role here? Let us start with the easier one: chick weight. If the incubation process is done properly, the chick weight will be two thirds of the original egg weight. Thus, chick weight is relatively predictable for the hatchery when eggs from known source

**Table 1. Early + mid embryo mortality (%), egg weight loss during incubation (%) and hatch of viable embryos (%) of cracked and normal eggs of two brown egg layer strains. The differences between normal and cracked eggs were significant ( $P < 0.001$ ) for the three presented traits in both lines. The procedures GENMOD (for embryo mortality and hatch of viable) and GLM (for egg weight loss) were used for the analysis (SAS 9.3).**

	Line 1		Line 2	
	Normal	Cracked	Normal	Cracked
Embryo mortality (< day 18) (%)	6.0	12.5	7.5	32
Hatch of viable (%)	77.7	57.0	85.1	63.2
Egg weight loss until day 15 (%)	8.8	10.8	9.8	12.7



Weighing H&N Super Nick chicks.

flocks are used, as breeder management and nutrition does influence the hatching egg weight. So what hatching egg weight should be targeted in order to improve chick quality? The answer is: it depends. It depends on the breeder flock age. The critical period is the start of production until approximately 30 weeks of age.

The higher the egg weight during this period, the earlier the eggs can be used as hatching eggs and the higher the resulting chick weight will be. This is an advantage at this point. Smaller chicks from young breeder flocks are not expected to perform less well as a laying hen. However they

require special attention during transport and brooding. In simple terms, heavier chicks make life easier. In order to achieve a good early egg weight, the body weight development during rearing and the timing of sexual maturity are crucial. It is important to avoid underweight compared to the breed standard – especially during the first 5–6 weeks.

Stocking density, house temperature and the lighting program are important management tools to achieve this goal. The latter should also be used to delay sexual maturity in order to support a high egg weight at onset of lay.

After 30 weeks of age the feed formulation and feeding management should be used to limit the further increase of the hatching egg weight. Usually eggs of more than 60g will show reduced hatchability while giving no real benefit – for example no benefit regarding first week mortality.

First week mortality is often addressed when talking with farmers about chick quality. Often the hatchery looks like the cause when the mortality exceeds the accepted level. However, there are many different other factors to consider, starting with the brooding and transport conditions,

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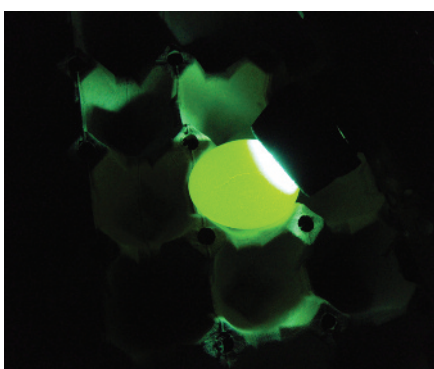
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followed by the hatching egg quality. According to practical experience, the quality of the eggshell plays an important role here.

Once the eggshell has deteriorated due to flock age, problems can occur if the egg handling procedures are causing a higher number of cracked eggs. In practise this is often associated with a higher percentage of contaminated eggs.

As meaningful mortality trials are difficult to conduct, Table I shows the results of a hatchability test performed with two brown egg laying strains. Before egg setting, different egg quality traits were measured including the dynamic stiffness of the egg shell. Dynamic stiffness allows the

#### **Identifying hairline cracks.**



#### **Weighing eggs.**

identification of eggs with very small hairline cracks, which are not visible by eye.

Although the egg weight loss of the cracked eggs during incubation was not excessively high, the hatchability was clearly reduced.

The test results suggest that eggshell quality is crucial for optimum incubation results. The management and feeding of layer breeders should therefore be designed to support shell quality by an adequate calcium supply and a healthy liver.

While the liver is involved in making the vitamin D3 available, the calcium is the basic component of the eggshell. It needs to be provided in large quantities during eggshell formation, which mainly takes place during the night. If just fine limestone is used in feed

there is no calcium available from the gastro-intestinal tract during this time, as the fine limestone dissolves quite quickly. In this case the hen needs to take the calcium from the medullary bone.

As the efficiency of this process declines with age, it supports eggshell quality as well as bird health when two thirds of the daily calcium supply is provided by coarse limestone. If technically feasible the coarse limestone is ideally fed during the afternoon hours to match the requirements of the chicken later on. ■

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*References are available  
from the author on request*