The aim of every commercial layer hatchery is a maximum hatchability of first quality chicks. Only healthy and vital chicks are able to have a good start in the rearing period after being handled and transported. Good chick quality is clear to see with a low first week mortality rate and a uniform development of the whole flock. It is therefore the key to success not only for the hatchery but also the rearing farm.

The key to success

A first indicator for chick quality is the percentage of second grade chicks. This percentage is naturally influenced by the age of the breeder flock. Young breeder flocks, for example at <30 weeks, usually give poorer results. If the chick quality does not improve with the age of the breeder flock, examinations need to be performed in order to find out the causes.

These causes can either be the age of the hatching egg and the general quality of the same, transport and storage conditions as well as the disinfection of the hatching eggs. Hatchery-related conditions might also have an impact on the quality of day old chicks. These include temperature, humidity levels, ventilation, frequency and the angle of turning during incubation.

The evaluation of chick quality in the hatchery provides important information on the whole production process. If properly applied, it can be used to detect possible weaknesses of the hatchery and the working routines in the same. Either quantitative or qualitative traits can be used for the measurement of chick quality. The qualitative traits are namely chick weight, chick yield, chick length and feather length. Qualitative traits include the vitality of the chicks, the quality of their navel, their beaks and joints.

Many hatcheries still hesitate to apply the examination of the qualitative traits in their quality monitoring program as these traits are highly subjective and hardly reliable. There are, however, methods that can help to measure the qualitative traits as objectively as possible, i.e. by reducing the individual subjectivity to a minimum. These so-called ‘scoring’ systems enable recordings of the first visual quality traits of a chick to be transformed into a quantifying assessment with a maximum score of 10 points. For every negative factor, one point will be deducted from the total of 10 points. Parameters that can be included in the scoring system are all of the above-mentioned qualitative traits as well as additional factors, for example the efficiency of vaccination and injuries. This can help to monitor and improve the chick processing quality.

Investigating chick quality

The point of investigation should be determined by the aim of the quality control. If these investigations serve the primary purpose of improving internal production processes, then chick quality should be investigated at takeoff. The

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In relation to chick weight, the quantitative trait ‘chick yield’ (chick weight at hatch in % of the egg weight at point of set) must be mentioned.

This is a simple method of checking whether the hatch time and incubation parameters are correct.

To accurately measure chick yield, it is important to measure the weight of completely filled setter trays at the point of setting and to calculate the average egg weight (do not forget to subtract the weight of the empty setter tray before calculating the average egg weight).

The weighed setter trays must be labelled in order to identify them on the day of transfer. On the day of hatch, the chicks which originate from these labelled setter trays must be weighed in order to calculate the average chick weight.

The ideal chick weight should be between 66-67% of the egg weight. If the chick weight is below target, this can be an indicator that the chicks were pulled too late and are therefore at the risk of dehydration. It can also be a sign that the humidity level chosen during incubation was too low.

If chicks are required to travel long distances, it can be appropriate to aim for a chick yield which is about 1% higher than the ideal of 66-67%. This can help to guarantee that the chicks arrive as fresh as possible at the rearing farm.

In order to achieve reliable results in terms of chick yield, at least 70 eggs and 70 chicks per breeder flock must be weighed. It will surely be more accurate if from every flock, three setter trays in different positions in the setter are investigated.

**Chick length**

In addition to chick weight and chick yield, the length of the chicks is another quantitative trait which can be recorded in the hatchery.

In order to measure a chick, it has to be placed alongside a ruler and the length needs to be measured from the tip of the beak to the end of the middle toe.

This trait is often taken in broiler hatcheries as it is well known that the chick length measured on hatch day can have a significant impact on the performance at the end of the rearing period.

For layer type chicks, this trait is not relevant as the chicks are able to compensate body weight development during the long rearing period of 18 weeks. If the hatchery manager nonetheless decides that the chick length should be recorded, the figures should be interpreted only in accordance with the hatch window.

Layer type chicks can grow more than 1 cm per day which means that the age of the chicks at the point of investigation is of crucial importance.

**Measuring feather length**

Examining the feather length of a newly-hatched chick can, in addition to other factors, help to optimise the incubation process. It can give an impression on how fresh the chicks are and if the incubation time chosen is either just right, too long or too short. It must be taken into consideration that the feather length varies...
between breeds. Fast-feathering chicks (for example the female line of the LB parent stock) already have much longer feathers at the time of hatch and the growth rate of the primary feather is also higher than in genetically slow-feathering birds.

When measuring the length of a wing feather, a ruler must be placed carefully between the wing feather and then the length can be recorded.

In the hatchery, LSL parent stock chicks show an average feather length of 9.6 mm with an average growth rate of 0.09 mm per hour. LB parent stock chicks, however, already show an average wing feather length of 15.6 mm which grows at 0.15 mm per hour.

**Chick vitality**

Chicks of premium quality must be lively and have a good body tension. This can be checked by placing a day-old chick on its back.

A good chick does not struggle to get back directly on his feet. One can say that it should not take more than three seconds for the chick to get back in an upright position.

**Navel**

An essential element in investigating chick quality is examining the quality of the navel. A good navel is closed, dry and free of egg shell and membrane residues.

The chick needs to be handled manually to control the quality of its navel. Of course, it is not possible to check every chick in a commercial hatchery prior to delivery.

**Beak and joints**

Investigating the condition of the beak and joints of the chicks can give several hints on incubation conditions. Both must have a normal appearance which means they have to be free of damage and wounds. Wounded beaks and joints are hints of non-optimal conditions in the hatcher.

Red dots on the beak indicate that the temperature in the hatcher was too high. Either the chicks wanted to break out of the egg shell too fast and damaged their beak by working too hard on the egg shell or they tried to regulate their body temperature by breathing through the openings of the hatch basket. By doing so, they damage the upper part of their beaks.

Injured joints can be a sign of a very high humidity level during incubation. Chicks which are hatched under these high humidity conditions must put in more effort to break out of the shell, which then harms their joints.

**Investigating belly quality**

The belly of day old chicks must be soft and smooth. Bloated, stiff and hard bellies are signs of a badly absorbed yolk. This often leads to problems during brooding and results in a higher first week mortality rate.

Causes for big and hard bellies in layer type chicks might be due to both insufficient water loss and too high temperatures during the incubation process. A hard belly is also a sign of a yolk sac infection.

**Evaluation of data**

The collection of data can be done by means of written forms and/or can be directly entered into a computer program. A good practice is to collect the data based on breeder flock and hatch day. This aids an overview on performance fluctuations related to breeder flocks and/or to hatch day or even season of the year.

Of course, data collection only makes sense if one is able and willing to search for the causes for obvious differences in chick quality. Only this can help to improve the production process.

**Summary**

The aim of every hatchery is to achieve the highest possible number of premium quality chicks. To get an idea on the quality of produced and ready to sell chicks, it makes sense to collect data of chick quality using clearly defined parameters.

These parameters can be both quantitative and qualitative traits. Quantitative traits are namely chick weight, chick yield, chick and feather length.

Qualitative traits are more subjective and include the investigation of chick activity and the quality of the navel, beak and joints. There are methods which can help to measure the qualitative traits as objectively as possible to achieve a reliable overview about the produced chick quality.

**References are available from the author on request**