Nuscience
Booiebos 5 • B-9031 Gent (Drongen)
T +32 (0)9 280 29 00 • F +32 (0)9 282 00 27
E info@nusciencegroup.com • **www.nusciencegroup.com**

White paper

DOC Star® unlocks genetic potential

By Manu De Laet, product manager poultry at Nuscience

Nuscience
Booiebos 5 • B-9031 Gent (Drongen)
T +32 (0)9 280 29 00 • F +32 (0)9 282 00 27
E info@nusciencegroup.com • **www.nusciencegroup.com**

DOC Star® unlocks genetic potential

By Manu De Laet, product manager poultry at Nuscience

The domestic chicken is descended primarily from the red jungle fowl (*Gallus gallus*). Humans first domesticated chickens for the purpose of cockfighting in Asia, Africa, and Europe. Very little formal attention was given to egg or meat production. The real breeding like we know it now began around 1916. In 100 years, the selection companies made big steps in the genetic selection of the chicken breeds. Even though chickens are already one of the most efficient species to transform vegetable products into meat products, yet the selection companies go even further by selecting for an improved performance of the chickens. If the poultry industry would only count on the genetic companies for an improved performance, they will not reach their goals. Nutrition is playing a leading role in unlocking the genetic potential.

The fast genetic selection

Broiler chickens are among the fastest growing farmed species. Intensive genetic selection has led to birds that have a typical average daily weight gain of about 60 – 70 g. Typical broiler breeds (Ross, Cobb, Hubbard) grow even more than 100 g / day at an age over 35 days. Due to the intensity of genetic selection over the last 35 years, the 42 days body weight has been increasing by 45 g a year. FCR has been decreasing by 2.3 points a year (table 1). The expextations for the future are also favourable.

Table 1. Body weight, FCR and carcass yield evolution

	1980	1990	2000	2010	2020
Body weight at 42 days (g)	1135	1588	2042	2495	2948
FCR	2.35	2.15	1.85	1.65	1.40
Carcass yield (%)			70.2	75.2	80.2

Nutritionists all agree that the chicken from today needs another diet compared to the chicken of many years ago. Havenstein published an article in 2003 where he compared the breed and the diet of 1957 with the breed and the diet of 2001 (table 2).

Table 2. Breed and diet of 1957 and strain and diet of 2001

Breed	Diet	Bodyweight (g)	FCR	Breast meat yield (%)
1957	1957	591	2.28	11.5
1957	2001	641	2.05	11.2
2001	1957	2271	1.88	17.0
2001	2001	2903	1.58	19.5

The breed of 2001 will never have the same end weight and FCR at 42 days with a diet of 1957, compared to the same breed of 2001 with the tailor-made diet of 2001. So it is clear that also nutrition has a key role in the positive performance evolution of the broilers.

Since the chickens need to grow faster compared to the past, the start of the day-old chicks becomes even more important. All poultry farmers know that a good start of the day-old chickens means that half of the work is already done. To achieve a good start, the nutrition during the first days has become extremely important.

Young animal challenges

Broiler day-old chickens have to cope with some challenges. On the one hand, there is the extremely fast growth in the beginning and on the other hand, the birds' organs need to grow first.

Broiler chickens are growing over 100 g / day at the end of the growing period. Nevertheless, relatively to their own body weight, they are growing the fastest at the start of their lifetime (figure 1). The first days, day-old chickens need to grow 30-35 % of their own body weight. Often, a starter feed is supplied to these chickens. This starter feed is given from day 1 until day 10-14. Day-old chickens have totally different nutritional needs at day 1, compared to the needs at day 10. In this case, a brooding complement for the first days can give a large benefit to the young day-old chickens.

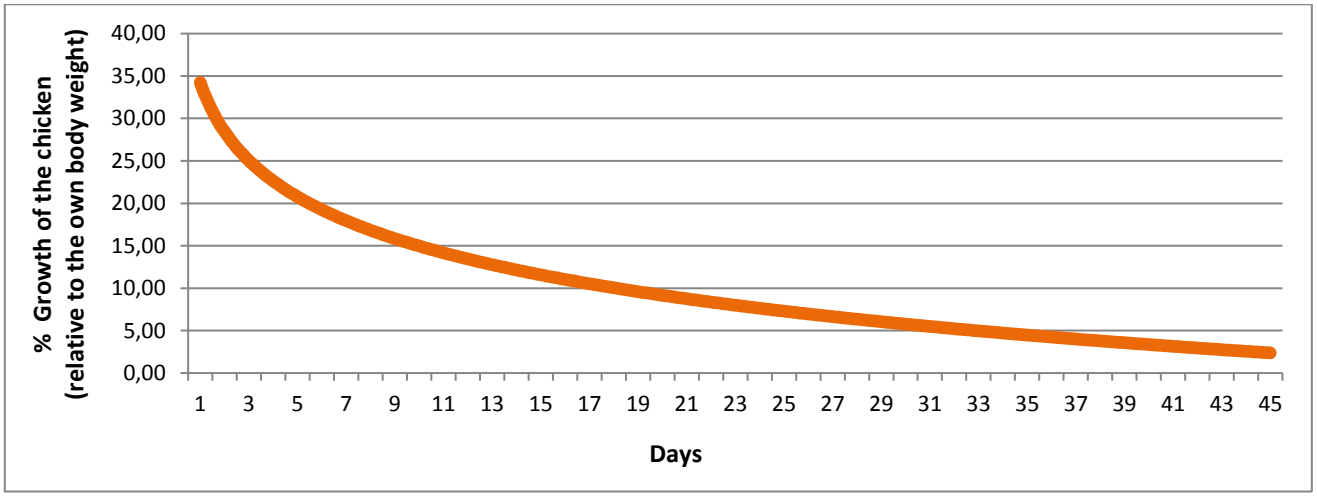

Figure 1. Growth of the chicken (relative to the own body weight)

Non-domesticated birds (the finch, the woodpecker, the ringdove, …) are all altricial birds. This means that the mother and father are feeding the young birds with raw materials that are very easily digestible (worms, insects, …). This story is different for the domesticated birds. The chickens are precocial birds and they don't have the parents to feed them (figure 2). Instead they need to eat the more difficult digestible feed that we offer them (soybean meal, wheat, corn, …). That is why during the first week the body weight of a broiler chicken multiplies by 4, but the organs multiply by 10. The overall development is not focused on body weight gain, but on intestinal development. In this case, it is important that the day-old chickens also get a feed that is focused on this organ development.

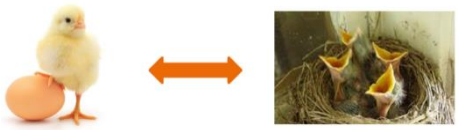

Figure 2. Precocial birds vs altricial birds

Nuscience
Booiebos 5 • B-9031 Gent (Drongen)
T +32 (0)9 280 29 00 • F +32 (0)9 282 00 27
E info@nusciencegroup.com • **www.nusciencegroup.com**

DOC Star is key

Research of Nuscience has shown that DOC Star, a brooding complement for the first 2 days, can give a large benefit to the birds. DOC Star is able to promote the early development of the organs and the gastro-intestinal tract (figure 3). This can be achieved by using the correct raw materials and the specific amino acid ratios that are needed for the organs to grow.

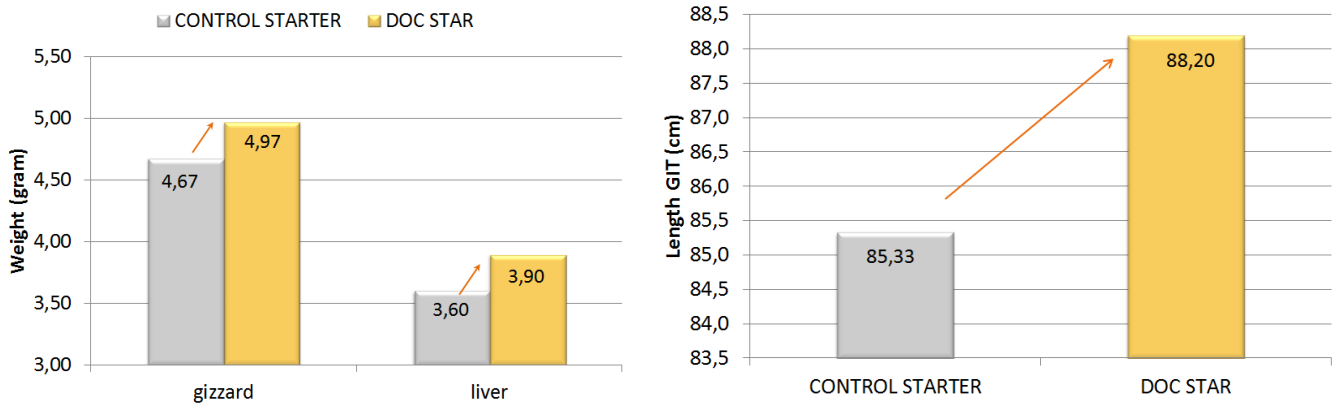

Figure 3. DOC Star pomotes the development of the organs and the gastro-intestinal tract

With this good fundament, the chicken will be able to use the nutrients supplied in the rest of the life in a more efficient way. The result will be a higher body weight at the end of the growing period with a lower feed conversion ratio. In addition, mortality will be lower because the small chickens will have the biggest benefit of the brooding complement (table 3).

Table 3. DOC Star improves body weight, FCR and mortality at 40 days of age

	Control (with normal starter)	DOC Star
Body weight (g)	2480	2580
FCR	1.77	1.73
Mortality (%)	2.8	2.2

With DOC Star the complete genetic potential of the broiler chickens is unlocked

References available on request

DOC star
brooding