Breeder hens – getting the best performance using feed technology

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Breeder hens are perhaps the most valuable animal in the poultry industry and, as such, their performance is paramount to not only the economic success of the breeder business, but also how it impacts the production chain through hatcheries and broiler production.

Breeders are long lived birds and so their welfare and efficiency in egg laying is directly related to the overall costs of poultry production. As poultry has become the main source of animal protein for the human population, there is increased scrutiny on management and welfare, as well as achieving high levels of efficiency to keep the end costs to consumers at an affordable level. Balancing these parameters requires a special focus on feeding requirements.

Early nutrition is key

Breeders have specific needs depending on their lifestage. Successful rearing and point of lay is crucial to later performance, including the persistency and length of the laying period. Research from Noy and Sklan in Israel demonstrated over a decade ago that early nutrition is key to animal welfare, disease control and efficiency in adult birds.

In all poultry, welfare and the avoidance of antibiotics in feed are both important considerations in modern production systems. Zootechnical feed ingredients have been developed to replace ingredients that have been traditionally used in diets.

Treatment	Eggs per hen	Lay (%)	Peak performance (%)
Control	100.81	68.57a	71.63
MOS	107.27	73.26b	75.70
P value	0.08	0.0001	0.20

a-b Means within row with no common superscript differ significantly (P<0.05)

Table 1. Effect of mannanoligosaccharides on breeder performance (weeks 30-50).

These advanced products offer much more than replacement value – many of them also offer additional benefits in terms of immunity, health and welfare. These aspects of poultry production are crucial at all stages, especially in an era of total traceability throughout the production chain.

Trials published in 2009 by Peric et al. reported that using prebiotics in the diet, such as mannanoligosaccharides (MOS) have an important impact on breeder hens. MOS is already well established in its ability to reduce the pathogenic load in the gut, inhibiting the colonisation of serious bacteria, such as salmonella and E. coli, which can also impact on embryonic growth and subsequent chick performance.

In a large scale trial using 24,000 Hubbard breeders, feeding MOS resulted in significant improvements in percentage lay with higher proportions of egg yolk to white. Chick body weight and length at hatch were also observed in hens fed MOS, which resulted in improved eggs and progeny, with uniformity of chick size (measured by body length).

These findings demonstrated the benefits of including MOS in breeder hen diets, not only for the hens' benefit, but also for egg and chick quality, which can improve subsequent broiler production (Tables 1-3).

Larger hatchlings of more uniform size are linked to broiler growth performance and the overall uniformity of the flock, leading to more saleable birds at the end of the growing period. Feeding MOS to breeder hens facilitates these aims.

Researchers recommended that MOS should be considered as part of the standard feeding practise in breeder flocks to enhance digestion and gut health in the parent flock and to promote production of improved quality broiler chicks for meat production.

Earlier work has already established that feeding MOS to laying hens could increase persistency of lay, resulting in increased egg yield and improved quality over the laying period. It is important to note as it demonstrates the link between gut health, immunity and productive performance, as well as the economic benefits to the producers for maintaining output of settable, fertile eggs for a longer timeframe.

Significance of selenium

Research by Renema (2003) investigated the significance of antioxidants, mainly selenium (Se), for breeder hens. Antioxidation control via feed is essential for fertility, reproductive parameters, number of fertile eggs and hatchability in poultry. In this trial, Ross 508 pullets were reared and exposed to photostimulation (at 22 weeks of age).

Pullets were fed a selenium-free laying ration as a control diet, a standard ration containing sodium selenate (0.3mg/kg), or an organic selenomethionine yeast ration (0.3mg/kg of Sel-Plex) to examine the

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Table 2. Effect of mannanoligosaccharides on composition of eggs.

Diet	Egg weight (g)		Shell on boiled egg (%)	Peeled egg (%)	
	Fresh	Boiled		Egg white	Egg yolk
Control	65.80	62.90	17.72	63.31[a]	36.59[a]
MOS	64.20	62.15	15.47	62.27[b]	37.73[b]
P value	0.36	0.68	0.06	0.05	0.018

a-bMeans within column with no common superscript differ significantly (P<0.05)

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influence not only of Se supplementation, but also the source of Se in the diet.

30 hens per dietary treatment were inseminated weekly from 30 weeks of age, using pooled semen from males fed a standard, sodium selenate diet or a selenomethionine yeast supplemented diet.

The data showed that total egg production was similar early in lay, but improved in late lay, when production was 68% for birds fed Sel-Plex compared to 60 and 61% in the control and inorganic Se fed birds, respectively.

Settable egg production from 40 weeks of age in Sel-Plex-fed birds (87.4) was higher than in control birds (80.6), while inorganic Se birds were intermediate (83). The figure for unsettable eggs from 40 weeks of age was 0.9% for the Sel-Plex groups compared to 3.3% for those from control birds.

Prior to 34 weeks old, hatchability averaged 88% in eggs from those fed Sel-Plex, compared to 80% in control birds and 77% for eggs from hens fed inorganic Se.

Chick body length (cm)	Control	MOS
Average	18.32[a]	18.58b
Minimum	16.1	17.0
Maximum	19.8	19.6

a-b Means not sharing a superscript within rows differ significantly (P<0.05)

Table 3. Body length of the day-old chicks from breeder flocks fed either a control or MOS supplemented feed.

Perivitelline sperm holes for both groups fed supplemented Se of either source were similar. Both treatments had more sperm holes than the eggs from control-fed birds by a ratio of 2:3. The researchers concluded that reproductive traits were improved with the inclusion of dietary selenium, while the organic Sel-Plex treatment improved egg production traits.

Shell quality, which can significantly affect the setting of eggs, as well as their hatching, is related directly to other minerals in feed.

Egg assessments from hens fed organic minerals, versus inorganic minerals, in feed have shown an increase in shell quality percentage and uniformity even when organic minerals are included at much lower levels (25%) compared to the traditional inorganic mineral inclusion recommendations. A 2% increase in egg production was also reported as an average over various trials.

Bonus for breeding hens

In addition, research has shown that feeding organic minerals can contribute to increased bone mineralisation and tissue mineral reserves, to be called upon during times of extra requirement. This is especially important in breeding hens, as they are potentially vulnerable to skeletal weakness, a major welfare concern, due to calcium (Ca) reserves being depleted at maximum laying performance.

Additional benefits of using both MOS and organic minerals in poultry feed include improved gut microflora through development and stability, improved immunity and higher bioavailability from organic minerals, including building tissue reserves to combat stressful or high performance periods during their lifespan.

Breeder producers need to consider several aspects of their management and feeding strategy in order to achieve the best return, while maintaining the welfare of their flocks and meeting retailer and consumer demands for high quality eggs or meat.

Choosing a proven technical feed ingredient can result not only in the replacement of undesirable ingredients, but can convey other benefits which can improve the bottom line, while meeting new standards in poultry production. ■