



Improving Egg Production Profits with Pullet Weight Management

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Pullet body weight strongly influences sexual maturity and overall reproductive performance of the adult layer. Proper gut health management is key to achieving ideal body weight and ensuring optimal performance and profitability.

With regard to pullet body weight and layer performance, sexual maturity is directly correlated with the onset of the production cycle. Flock uniformity at sexual maturity allows producers to have a sooner start of production, higher peak lay, and better persistency of egg production. Another advantage of having flocks with uniform body weights is the ability to easily meet the nutrient requirements for the entire flock with one diet.

Ideally, the uniformity of body weights within a particular flock should be close to 85% (*Figure 1*). Pullets with

body weights that are too low tend to reach sexual maturity later and produce less eggs over their lifetime than heavier birds. Furthermore, pullets not achieving target body weight could demonstrate poor physiological and anatomical conformation, particularly in the gastrointestinal and reproductive systems.

Off target

There are several consequences of having body weights that exceed the target during the growing period. Obese hens do not have normal vaginal mucosa retraction and often prolapse, thus exposing them

to pecking by other birds. This abnormality leads to increased mortality and early reduction of egg production. Other undesirable consequences, such as increased basal nutritional requirements and higher production of non-marketable eggs, may consequently reduce profitability.

Phytogenic Feed Additives

Phytogenic feed additives (PFA) have shown positive effects on gastrointestinal anatomy and physiology and nutrient digestion and absorption. These positive effects are due to increased production of pancreatic enzymes, improvement in intestinal integrity, and augmented bile secretion. Pancreatic enzymes aid in the digestion of nutrients such as lipids, carbohydrates, and amino acids in the intestinal lumen. By optimizing nutrient digestibility and improving intestinal morphology, nutrient absorption is also enhanced. Overall, phytogenic feed additives improve nutrient utilization, thus allowing more nutrients to be utilized by the bird to reach the ideal body weight.

Phytogenics are also able to decrease the amount of pathogens in the gastrointestinal tract. The increased digestibility when phytogenics are used leads to a

decrease in free protein in the lumen of the intestine, diminishing the pathogen's ability to proliferate.

Probiotics

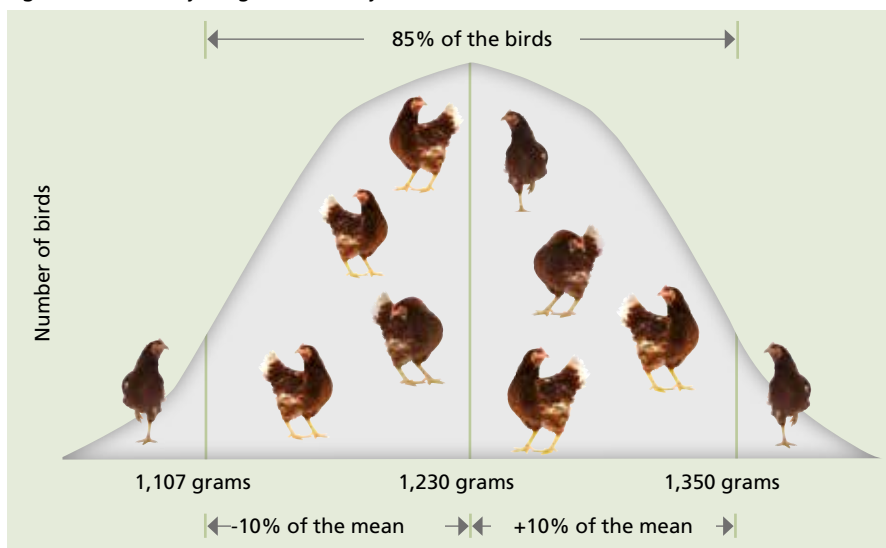
Probiotics stabilize the gastrointestinal microbiota by preventing the colonization of pathogens such as *Escherichia coli*, *Salmonella*, and *Clostridium*, supporting immunity against microbial and environmental insults, and enhancing intestinal integrity. The efficacy of probiotics may be modified by the amount and kind of strains being utilized. Often times, several strains used in conjunction can be more effective than a single one. Some of the beneficial effects caused by probiotics include enhanced nutrient absorption due to increased length and width of the intestinal villi and augmented secretion of important digestive enzymes such as amylase. Additionally, several studies have demonstrated that birds fed diets supplemented with probiotics display an enhanced immune response against pathogens and better performance than non-supplemented birds.

Organic Acids

Animal feed has been identified as a notable carrier for numerous bacteria that

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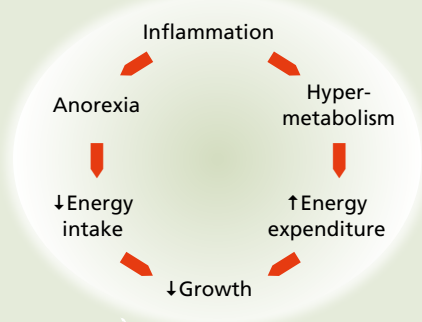
Figure 1. Ideal body weight uniformity.



Source: Hy-Line International, Technical Update: Growing Management of Commercial Pullets

Impact of Inflammation on Performance

Inflammation is an expensive physiological process that leads to a reduction in energy intake as a consequence of depressed feed intake (anorexia), and requires significant energy investment in immune cell activity, hyperemia, and tissue repair.



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can cause health issues not only for the animal ingesting the contaminated feed, but also humans who may come in contact with products from those infected animals. Feed can become contaminated by pathogens during harvest, handling processes, transportation, processing, and storage. Once ingested, bacterial pathogens can gain access to the gastrointestinal tract and cause tremendous investment of metabolic energy and loss of performance. For many years, science has shown that organic acids can reduce bacterial load in animal feed. The mechanisms by which organic acids exert their beneficial effects include their ability to disrupt intracellular pH regulation, thus causing cell death, reduce intestinal pH, creating an environment unsuitable for pathogenic growth, and enhance digestive enzyme activity. Through these mechanisms, organic acids reduce pathogenic burden in the intestine and promote growth and improved performance in birds.


Costs of Inflammation

Intestinal health is fundamental to achieving and maintaining ideal body weight. Intestinal health may be disrupted by several situations such as pathogenic challenge, poor quality feed ingredients, and environmental stressors. These insults may trigger intestinal inflammation, which results in expensive costs in the physio-

logical economy. When challenged with inflammatory processes, the body has less energy to spend because of lowered energy intake due to anorexia; on the other hand, energy expenditure is higher because of the increased metabolic rate caused by inflammation. Fortunately, nature offers some tools that are able to counteract the negative effects of inflammation such as phytogenic feed additives and probiotics.

Summary

Effective digestion, absorption, and investment of nutrients leads to the achievement of target pullet body weight and increased flock uniformity. Optimal production onset, peak, and persistency will occur only in pullets with ideal and uniform body weights. Furthermore, appropriate body structure and physiology lead to the production of more marketable eggs. Overall, these features ultimately determine the production cycle profitability.

Phytogenic feed additives, organic acids, and probiotics are able to optimize nutrient digestion and absorption, reduce pathogenic load in the intestine, modulate the immune response, and improve gastrointestinal integrity. Thus, these novel feed additives may allow the reallocation of resources from immunological responses against insult towards anatomical development and ideal body weight in pullets. 

What's Wrong with My Birds?

Part 9: Lameness conditions (bacterial pathogens)

In 50 years, broiler growth rates have increased dramatically due to intense genetic selection and enhanced nutritional programs. Fast growth places great demands on birds' musculoskeletal systems, which can result in impaired locomotion and lameness. Lameness reduces animal well-being and has severe economic consequences from poor growth, increased culling and mortality, and increased carcase condemnation and downgrading at slaughter.

Lameness is often a multifactorial condition. Understanding the various causes can help producers identify areas for improvement and develop effective strategies to reduce the incidence of lameness in their flocks. Conditions responsible for lameness can be of infectious or non-infectious origin. This table focuses on lameness conditions caused by bacterial pathogens and suggests solutions that can help prevent or alleviate lameness caused by these conditions.



Condition	Corrective action
Bacterial Chondronecrosis with Osteomyelitis (BCO)	
<ul style="list-style-type: none"> • Etiology: <i>Enterococcus cecorum</i>, <i>Streptococcus</i> spp., <i>Staphylococcus</i> spp., <i>E. coli</i> • Symptoms: Bird will be sitting on its breast/keel, with the legs directed forward, use of wings for walking support and hip flexion • Lesions: Necrotic degeneration and microbial infection, primarily within the proximal heads of the femur and tibia 	<ul style="list-style-type: none"> • Prevention: Improve gut integrity by feeding multi-strain poultry-specific live probiotic • Treatment: Antibiotics depending on severity, but mostly birds are euthanised
Vertebral Osteomyelitis/Spondylitis/Spondylopathy/Spondylolisthesis/Kinkyback	
<ul style="list-style-type: none"> • Etiology: <i>Enterococcus cecorum</i>, <i>Staphylococcus</i> spp., <i>E. coli</i> • Symptoms: Typically starts from day 22, bird will be sitting on its breast/keel, with the legs directed forward, posterior paralysis due to spinal cord compression • Lesions: Abscess and/or necrosis in T4-T7 vertebrae, dorsal buckling of spinal cord (kyphosis), interstitial oedema, atrophy, degeneration of muscle fibres 	<ul style="list-style-type: none"> • Prevention: Improve gut integrity by feeding multi-strain poultry-specific live probiotic • Treatment: Antibiotics depending on severity, but mostly birds are euthanised
Bumble Foot	
<ul style="list-style-type: none"> • Etiology: <i>Staphylococcus</i> spp. • Symptoms: Swelling above the hock and around the hocks and feet. • Lesions: Abscess on hock joint, infected joints may have clear exudate with fibrin clots 	<ul style="list-style-type: none"> • Prevention: Improve gut integrity by feeding multi-strain poultry-specific live probiotic • Treatment: Antibiotics
Fowl Cholera	
<ul style="list-style-type: none"> • Etiology: <i>Pasteurella multocida</i> • Symptoms: Swollen hock joints, swollen wattles and comb, greenish diarrhoea • Lesions: Necrotic foci on liver, petechiae in the epicardial fatty tissues 	<ul style="list-style-type: none"> • Prevention: Vaccines only if endemic • Treatment: Antibiotics
Osteomyelitis Complex	
<ul style="list-style-type: none"> • Etiology: Bacterial, but no specific pathogen has been identified • Symptoms: None • Lesions: Green discoloration of liver, inflammatory lesions in bones and joints 	<ul style="list-style-type: none"> • Prevention: Improve gut integrity by feeding multi-strain poultry-specific live probiotic • Only identified at slaughter
Bacterial arthritis/Airsacculitis (MS)	
<ul style="list-style-type: none"> • Etiology: <i>Enterococcus faecalis</i>, <i>Mycoplasma synoviae</i> • Symptoms: Ruffled feathers, swollen hock joints and feet, tbilaterally asymmetrical legs • Lesions: Joints and tendon sheaths have viscous grey to yellow exudate, caseous exudate from the lesions 	<ul style="list-style-type: none"> • Prevention: Improve gut integrity by feeding multi-strain poultry-specific live probiotic • Treatment: Antibiotics and eradication of infected breeding stock

References are available on request

For more information, visit www.mycotoxins.info

DISCLAIMER: This table contains general advice on poultry-related matters which most commonly affect poultry and may be related to the presence of mycotoxins in feed. Poultry diseases and problems include, but are not confined to the ones present in the table. BIOMIN accepts no responsibility or liability whatsoever arising from or in any way connected with the use of this table or its content. Before acting on the basis of the contents of this table, advice should be obtained directly from your veterinarian.