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Nutritional Management of Laying Hens for Extended Production Cycles: Evaluation of a Hybrid Feeding Strategy

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A B S T R A C T

Extending laying cycles to 100 weeks or more presents significant nutritional challenges for modern high-producing hens. Traditional age-based feeding strategies may no longer meet the birds' evolving physiological needs. This study evaluates H&N International's Hybrid Feed system, which integrates pre-lay and early production nutrition into a unified, performance-based approach. Introduced at 17 weeks and maintained until approximately 70% egg production, the Hybrid Feed features reduced energy density, elevated amino acids, moderate fiber, and a high proportion of coarse calcium. Results show improved body weight, feed intake, and metabolic adaptation during early lay. The system supports targeted egg size management through amino acid adjustments and emphasizes energy intake driven by body weight and environment. A three-phase feeding model is proposed, with nutrient modifications tailored to production stages rather than age. This strategy enhances eggshell quality, skeletal integrity, and overall productivity, offering a dynamic nutritional framework for extended-cycle layer management.

Keywords: *Extended laying cycle, Hybrid Feed, layer nutrition, coarse calcium, performance-based feeding*

Extending laying cycles in commercial poultry production, reaching 100 weeks or more without molting, presents significant nutritional challenges. Traditional pre-lay and phase-feeding strategies may not adequately meet the evolving physiological demands of modern high-producing hens. This article evaluates the efficacy of a "Hybrid Feed" system developed by H&N International, which integrates developmental and production-phase nutrition elements into a singular strategy designed to support early productivity, skeletal integrity, and long-term performance.

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The Hybrid Feed approach is introduced at the transition from the rearing to the laying phase, beginning at 17 weeks of age and continuing until hens reach approximately 70% production, typically around week 21. This feed is characterized by reduced energy density, elevated levels of amino acids, moderate dietary fiber, and a minimum of 60% calcium in coarse particle form (≥3.5 mm) (Table 1). These features stimulate feed intake during rapid physiological change, including the onset of reproductive maturity, peak skeletal calcium storage, and early egg formation. Following this phase, hens are transitioned to a Layer 1 feed maintained until approximately week 25. Production benchmarks rather than chronological age determine the change between feed types, reflecting a shift toward performance-based nutritional transitions (1, 2).

Table 1. Nutrient Composition of Hybrid Feed used between 17 and 21 weeks of age.

Nutrient	%
Metabolizable Energy	2810
Digestible Lysin	0.76
Digestible Methionine	0.38
Digestible Methionine + Cysteine	0.686
Digestible Threonine	0.53
Digestible Tryptophan	0.168
Digestible Isoleucine	0.61
Digestible Valine	0.67
Digestible Arginine	0.79
Crude Fiber	2.5
Calcium	3.65
Available Phosphor	0.40
Na (Sodium)	0.17
Cl (Chlorine)	0.17

Experimental data and field observations demonstrate that hens on the Hybrid Feed exhibit higher body weights at the point of light stimulation and achieve standard weights by 25 weeks. Enhanced feed intake during this early laying phase supports the development of calcium reserves and the initiation of consistent egg production. The Hybrid Feed also facilitates a smoother metabolic transition into peak laying, reducing stress associated with sudden dietary changes. Trials incorporating four distinct amino acid profiles revealed that dietary manipulation allows for targeted adjustment of egg size, with measurable changes observed within two to three weeks. These changes did not compromise lay rate or feed efficiency, provided that overall dietary energy levels were sufficient (Figure 1) (3).

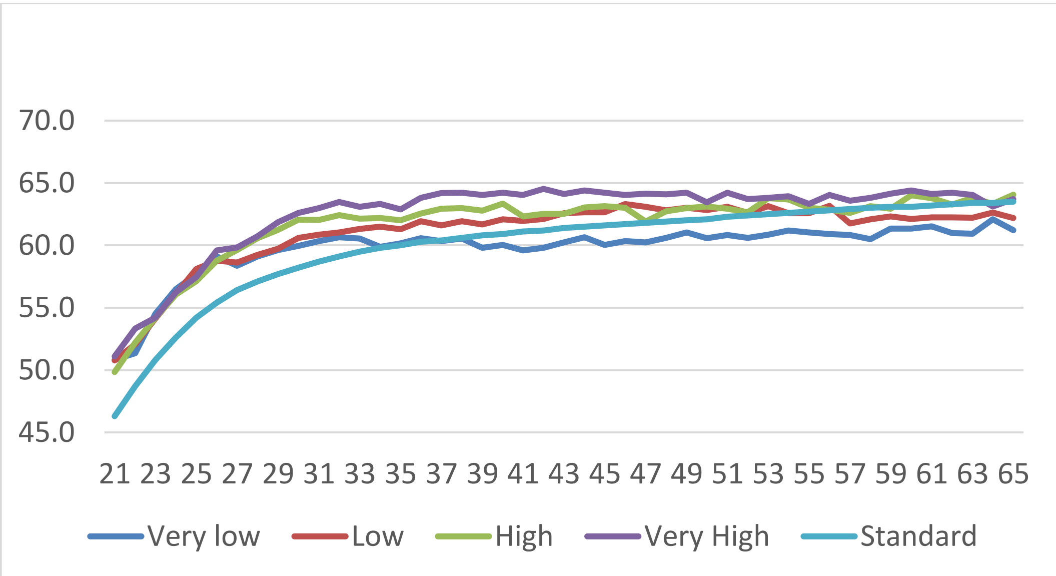

Figure 1. Effect of Amino Acid Profile on Egg Size Development

A central finding is that feed intake in laying hens is driven primarily by dietary energy concentration rather than genetic predisposition. For example, the same layer genotype exhibited significantly different daily feed intakes in different geographic markets solely due to differences in diet formulation. The importance of precision in energy density calculation is underscored, highlighting the nutritionist's critical role in determining flock performance. Energy requirements are predominantly dictated by maintenance needs, which account for approximately 65% of total daily energy expenditure and scale proportionally with body weight. Every 50-gram increase in body weight corresponds to an additional requirement of approximately 4 Kcal per day. This relationship necessitates continual monitoring and adjustment of diets in response to changes in body weight or environmental conditions, particularly in warm climates where feed intake may decline due to heat stress while metabolic energy demand increases (4).

Beyond energy and amino acids, calcium and phosphorus management is crucial in long-cycle hens. As hens age, calcium requirements increase due to reduced gastrointestinal absorption and the sustained demands of eggshell formation. At the same time, phosphorus requirements decrease after the peak of production (5). Coarse calcium particles are retained longer in the gizzard, enhancing absorption and reducing reliance on medullary bone stores. By the later stages of the cycle, it is recommended that up to 85% of calcium be provided in coarse form to support eggshell quality. Excess phosphorus, especially in older hens, may suppress calcium uptake and contribute to hypocalcemia. Therefore, a progressive decrease in dietary phosphorus and an increase in total calcium and coarse calcium content is advised (6).

A proposed feeding program for extended-cycle layers consists of three phases. In Phases 1 and 2 (22 to 70 weeks), energy and amino acid levels should remain stable, reflecting the consistency of body weight and egg mass during this period. Adjustments should focus on increasing calcium and decreasing phosphorus. In Phase 3 (from 70 weeks onward), amino acid levels can be modestly reduced in response to declining egg mass, while calcium is further increased and phosphorus continues to be lowered. These recommendations are based on performance monitoring rather than fixed age points, ensuring that hens receive the nutrients necessary for sustained productivity and shell integrity throughout the extended cycle (7).

Maintaining a consistent target feed intake is vital for evaluating nutritional adequacy. Variations from the expected intake should prompt immediate investigation into energy content, raw material variability, or environmental stressors. Seasonal shifts and ingredient quality changes can significantly affect common feedstuffs' energy and amino acid profiles such as corn, wheat, and soybean meal. Consequently, dynamic and responsive feed formulation practices are essential to maintain optimal hen performance over time (3).

The Hybrid Feed strategy offers a scientifically grounded, adaptable approach to modern layer nutrition. It aligns nutrient delivery with the specific physiological needs of hens during early and peak production phases, facilitating enhanced performance, improved eggshell quality, and better economic outcomes. This feeding model represents a substantial shift from age-based to performance-based feeding and highlights the value of flexible, data-driven nutritional management in contemporary egg production systems.

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Conflict of Interest

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