

Nutritional and management aspects of early poult performance

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Placement of turkey poults post hatch can be followed by a myriad of challenges to the baby turkey including nutritional and environmental conditions, which can result in the delay of or less than optimal level of nutrient intake. Besides growth implications, it is also during this time period that critical development of the digestive tract (and microbiota), immune system and skeletal system occurs (Jha et al. 2019). Delayed access and/or restricted nutrient intake in broilers which can occur due to delays in placement has been noted to decrease growth and carcass yield at market although the response at latter ages is less clear. Delayed access to feed for 24 hrs or more has been shown across several studies to decrease early weights as well as weights for older birds (de Jong et al. 2017).

More recently there is more emphasis on more highly digestible protein and energy sources, role of other supplements such as pre-and probiotics, enzymes, mineral levels such as calcium and other nutrients for optimal performance and health. Specialized starter diets could be beneficial but often it is difficult to relate initial brooding performance to latter performance at market age. Several studies have indicated that changes in initial growth often disappear after a few weeks. Under research conditions this might be quite possible as the negative control groups can undergo compensatory growth and catch up to the treatment birds later. However in the field, compensatory growth cannot always be relied on to occur.

While delays in nutrient access and subsequent impact have been better documented in broilers, the situation is less so for commercial market turkeys. Likewise determining the carryover effect of specialized diets to enhance growth and initial performance is needed in order to assess the economic viability. Similar to broilers, Corless and Sell (1999) demonstrated decreased poult performance with delayed placement. Lilburn (1998) noted the transitional change in energy stores with hatching and the lowered enzymatic capacity for digestion in poults for the first week and recommended more highly digestible energy sources carbohydrates and fats. Basic nutritional requirements have not been determined in the first few days in order to capture the true transition from hatch to post-hatch.

A series of trials were conducted at the Rosemount Turkey Research unit to examine the influence of early nutrition and management on subsequent poult and market age performance. Amino acids, energy, diet density of amino acids, fat source and protein were explored. All studies were conducted with male turkeys which were reared to 16-18 weeks of age. In most cases, a commercially obtained feed was used after the initial starting period ended at 6 wks of age. This allowed assessment of any carry over effect that might have been present to be determined. A summary of the studies is provided in Table 1.

Table 1. Summary of UMN early poult nutrition studies (male turkeys) and carry over effect on market body weight (BW)

Study no.	Study Factor(s)	Starter Phases (Research)	Grower Feed 6+ wks of age	Age BW Response Detected ¹	BW Carry Over (% of control) near market
		wks of age		wks of age	
1	Thr ratio	0-2,2-6	Commercial feed	2	1.5
2	Amino acid diet density	0-2,2-6	Commercial feed	1,2,3,6	4.4*
3	Lys/ME (L)	0-2,2-6	Commercial feed	L-6	L-4.25*
(Early Lay Poults)	& ME Level (M)			M-6	M-2.2*
4	Lys/ME (L)	0-2, 2-6	Commercial feed	LxM – 1,2,3	
(Late Lay Poults)	& ME Level (M)			L-2	L-3.1*
	Fat type (FT) & Fat Level (FL)	0-3, 3-6	Commercial feed	LxM – 3,6	M-2.2*
5	Fat Type (FT)	0-3, 3-6	Commercial feed	FT 1,2,3,6 FL 2,3, 6	FT -1.85* FL - 0.85
6	Processed Soy	0-3, 3-6	Research diets cont'd	1	(.63)
7	Processed soy	0-3, 3-6	Commercial feed	1	1.4
8	Post hatch holding	0-3, 3-6	Commercial feed	6	1.4
9	Post hatch holding	0-17 days	NA	2,4,7,10,17 (days)	At 17 days – (11.0)*
10	Post hatch holding	0-3, 3-6	Commercial feed	2,9,21,42 (days)	(2.3)*

*Significantly different from control ($P < .05$)

¹ Age when study factor was significant ($P < 0.05$)

The largest impact on subsequent market weight was for some aspect of amino acid nutrition, particularly that of general amino acid density (Study 2) and lysine in relation to diet metabolizable energy (Studies 3 and 4). Differences that were heavier than the control diet regimen were noted early, starting at 1 week of age. As a percent of the original control treatment, body weights ranged from 3.1 to 4.4% heavier near market age. Energy related components such as diet ME, fat source, and supplementation level resulted in lowered impact on market weight but the carry-over effect was still significant in some of the studies (Study 3, 4, and 5). Substituting more digestible soy products resulted in early performance improvements. However, the carry over affect was less (1.4%) and not statistically significant (Studies 7 and 8). It should be noted that despite the lack of significance, a 1.4% difference with a heavy tom market weight of 42 lbs, represents an additional .6 lbs of live body weight. For a 10,000 bird flock this would be an additional 5,880 lbs marketed. While most studies focused on the improving early performance, it's important to remember that early challenges during the hatching and post hatch placement can have negative effects. The most notable of these is the time between hatching and placement which can be excessive. In Studies 9 and 10, poults were placed on feed and water 48 hrs post hatch. In study 9, the trial ended at 17 days of age but

poult weight was significantly depressed at the end of the trial in comparison to the control group which received food and water at placement. For Study 10, the same placement schedule was used but the turkeys were raised to market age and a negative impact on final body weights was still present (-2.3%) relative to the control.

While demonstrated performance improvements throughout grow-out are necessary to justify additional cost of specialized diets, initial development of different organ systems should not be ignored as future challenges are not consistent and vary over time. Such studies need to go to market age and include carcass yield as well as other basic body systems such as immune response and behavior in order to fully assess the impact of either delayed response or inadequate nutrient intake. New hatch/brood systems will help with getting young birds started on food and water but specialized starter diets may still need to be provided.

References

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