Turkey Poult Response to Dietary Threonine and Protein

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Achieving the genetic potential of turkeys at market weight remains a challenge for producers. Results from the Light Turkey Syndrome project (Calvert, 2012) indicated that turkey poults start to fall behind their genetic potential for body weight after one week of age. Events occurring from the time of hatch to placement on the farm, followed by the initial brooding phase need to be considered in order to determine what is limiting the growth of poults early on. The poult faces a major transitional phase that starts prior to hatch and lasts through 7-10 days of age. At placement, the poult needs to find food and water. Early intake is critical to stimulate growth of the intestinal tract and other support organs in order to support subsequent muscle growth. Dependence on the residual yolk after hatch to provide energy and protein shortly after hatch may not be desirable for rapidly growing birds. Studies of feed deprivation after hatching have indicated the importance of adequate early intake on market weight and breast meat yield in poultry.

Genetic selection for rapid growth means greater emphasis should be placed on poult brooder management and nutrition to assure poults start eating after hatch. Studies with broilers have indicated that formulating diets with higher and more digestible protein for a short period of time after hatch may be of benefit to latter performance. Development and functionality of the gastrointestinal tract is dependent on adequate amino acid (especially threonine) and energy intake. The objectives of the proposed work were to: a) determine the influence of early poult nutrition through manipulation of diet protein level and protein source on poult performance (intestinal maturation, body weight and uniformity) and final market weights, b) determine if light and heavy weight poults respond differently to different pre-starter diets, and determine if poults from early lay and mid-lay breeders have different amino acid requirements.

In each of two studies, Large White male turkey poults from two different ages of breeder flocks (early and mid/late lay) were obtained from a commercial hatchery and were fed one of three or four diet treatments formulated for two age periods (0-2 and 2-6 wks of age). The basal diet was composed primarily of corn, conventional soybean meal, and meat bone meal. After 6 wks of age, all birds were fed a common diet to 17 wks of age in a group setting. In the first trial, the experimental design was factorial (2 x 3) with factors of age at breeder lay and threonine level (three dthr levels). In the second trial, the design was again factorial (2 x 4) with factors of age at breeder lay and protein level using the optimal dthr/dlys ratio. Both studies are currently in progress at the time of this abstract submission.

In the first study, dthr ratios of .54, .58, and .66 were examined. No interaction was observed among age at breeder lay and threonine level on body weight or feed efficiency. Ratios of .58 and .66 increased body weight at 4, 7, and 14 days of age as compared to the lowest ratio. Feed efficiency was also improved to 2 wks of age. However, differences were no longer apparent at 6 wks of age. In the next trial, four different protein levels were fed using the ratio of .58 for dthr with dthr increasing from .85 to 1.00% of the diet. In this study an interaction between breeder age at lay and protein level was observed for body weight at one week of age. Poults from young breeder hens tended not to respond to protein level while poults from older breeder hens increased body weight as

protein level increased. Preliminary results indicate that a .58 ratio for dthr to dlys was sufficient to optimize body weight to 6 wks of age and those poults from young breeders were unable to respond to diet protein.

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