

some physiological factors affecting the productive efficiency in chicken

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This study was carried out at the Poultry Research Farm Belonging to Department of Animal Production, Faculty of Agriculture, Zngn1,igUniversity~.Benha branch.It was aimed to determine the possibility of further improvement of the laying :performance and egg quality of the two breeds of chicken Hisex and Shaver, applying different levels of calcium and vitamin D3.Two hybrids of chicken were chosen: Hisex as a white hybrid and Shaver as a brown hybrid. An equal number of 540 day old female Hisex and Shaver breed hatched on Jily 1995, were used in this study.Chicks from each hybrid were divided into 9 experimental groups of 30 chicks each. Birds were fed a standard growing rations, but differed in the level of dietary calcium (0.8, 1.2 and 1~.60/0)and vitamin D (800, 1200and 1600 I.C.U). At sexual maturity pullets were fed standard layer ration,but differed in dietary calcium level (3.5, 4.5 and 5.50/0) per each level of vitamin D previously mentioned.I Body weight was recorded at hatch, 1th week age, at sexual maturity and at the end of experimental period. Feed consumption was daily recorded. Feed conversion was calculated for each treatment as kg ration/kg e~g produced. Age at sexual maturity, egg production rate, egg weight and mass were estimated throughout the experimental period which lasted for 8 periods of 21 day each and considered as traits of egg production performance.Absolute and relative weights of egg components, shell thickness and shell weight unit per surface area were estimated as traits of egg quality. Plasma calcium, inorganic phosphorus and alkaline phosphatase ,were also determined. At sexual maturity, at 500/0, the peak of egg production and at the end of the experimental period calcium absorption rate for each intestinal part was determined in vitro as total calcium absorption, .absorption per cm intestinal length and per gram dry matter of intestinal weight.Results obtained could be summarized , as follows : 1. Pullets of Shaver breed had the highest live body weight averages along the growing and laying period. 2. Hisex pullets matured earlier (162.5 days). It had tighter body weight at sexual maturity (989.2 g) while pullets of Shaver hybrid were the latest to reach sexual maturity (167.3 days) having the heaviest body weight (1127.3 .g). 3. Dietary calcium level showed highly significant effect on both age and body weight at sexual maturity, while it showed insignificant effect on egg weight. Providing pullets with 4.5% calcium in the diets delayed sexual maturity for 4.3 days it also decreased the egg weight by 0.27 g, lwhile 5.50/0 calcium level delayed sexual maturity for 7.1 days and decreased egg weight by 0.96 g when compared with diets containing 3.5% calcium level .4. Pullet's' breed, dietary calcium and' vitamin D3 level had highly significant effects on egg production .. Rate of egg production was higher for Hisex pullets (62.230/0/hen/day), for pullets received 3.5 i calcium l, (69.70 %/hen/day) and for pullets fed 800 I.U vitamin D r level (65.15°/olhen/day).5. Pullet's hybrid and dietary calcium level had no significant effect on egg weight, however dietary vitamin D3 level had significant effect-on egg weight : 6. The higher egg mass was obtained from pullets of Hisex hybrid. Pullets hybrid, dietary calcium and vitamin D3 levels had significant effect on egg mass. Providing pul1ets with 3.50/0 calcium had higher egg mass followed by 4.5% then by 5.5% calcium, respectively. 7. Pullets of Hisex breed had better feed conversion (2.83 kg ration /kg egg) than those of Shaver breed (3.00 kg ration/kg eggs). Dietary calcium level showed insignificant effect on feed conversion while dietary vitamin D3 level had significant effect on this trait.8. Dietary vitamin D3 level was only the factor that had insignificant effect on feed consumption. Shaver pullets significantly increased the average of feed consumption

(103.6 g/hen/day) when compared with Hisexpullets (99.4 g/hen/day). Dietary calcium level had highly significant effect on feed consumption, pullets fed 3.50% calcium level had the highest average of feed consumption (107.5 g/hen/day) when compared with the other two levels. 9. Egg of Shaver pullets were characterized by their higher albumen weight percent (61.67%) and lower yolk and shell proportional weights (25.93% and 9.81%, respectively). However, eggs of Hisex hybrid were characterized by lower albumen weight percent (61.10%) and higher yolk and shell proportional weights (26.32% and 10.37%, respectively). Diets containing 3.5% calcium and 800 LV had better effect on albumen weight percent than all other diets applied. Diet containing 4.5% calcium and 1200 LV. vitamin D3 had the better effect on shell weight percent. 10. Highly significant variation was found in shell thickness due to the pullet's hybrid. Hisex pullets laid eggs with thicker shell (0.403 mm) than pullets of Shaver hybrid (0.358 mm). Dietary calcium level had highly significant effect on shell thickness. Providing dietary calcium at a level of 3.5% increased shell thickness (0.387 mm) when compared with the other two levels of dietary calcium. While dietary vitamin D3 level had insignificant effect on shell thickness. 11. Plasma calcium content was significantly affected with dietary calcium level, pullet's fed 5.50% calcium had higher level of plasma calcium (23.9 mg/100 ml). On the other hand, no significant variation in this trait were observed due to pullet's hybrid or dietary vitamin D3 level. Plasma inorganic phosphorus content was significantly affected with pullet's hybrid, Hisex pullets had the highest level of plasma inorganic phosphorus. Dietary calcium and vitamin D3 levels had highly insignificant effect on plasma inorganic phosphorus. On the other hand dietary vitamin D3 level had highly significant effect on plasma alkaline phosphatase, while pullet's hybrid and dietary calcium level had insignificant effect on plasma alkaline phosphatase. 12. At sexual maturity only, pullet's hybrid showed significant effect on calcium absorption per cm length of small intestine. However, at the end of the experimental period, pullet's hybrid showed highly significant effect on calcium absorption per gram dry matter. Dietary calcium level showed highly significant effect on calcium absorption per cm length and per gram dry matter at sexual maturity, while it showed insignificant effect on these traits at the end of the experimental period. Dietary vitamin D3 level showed significant effect on total calcium absorption, absorption per cm length and per gram dry matter at sexual maturity. 13. Variation in all parameters of calcium absorption rate were observed to be significant due to the small intestinal part. Ileum had always the higher averages of both total calcium absorption, calcium absorption/cm length or per gram dry matter.