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Effect of Spiking on Hatchability Levels and Testicular Weight in Broiler Breeder

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ABSTRACT

The objective of present study was to investigate the effects of spiking of young and/or old males on broiler breeders flock hatchability levels and testicular weight at 45 weeks of age. Two hundred and fifty two female broiler breeders (Ross 308) were assigned to three groups at 24 weeks of age. Adding of males to females groups was carried out at 24, 45 and 45 weeks of age in groups 1, 2 and 3, respectively. Males of group 1 and 2 had 23 weeks of age and males of group 3 had 45 weeks of age. In group 3, adding young males, increased hatchability more than group 2 ($P<0.05$) but it wasn't statistically different from group 1 ($P>0.05$). No significant difference was observed in testicular weight between the treatment groups; however, testicular weight of group 3 was slightly more than the other groups ($P>0.05$).

Key words: Spiking, Broiler Breeder, Hatchability, Testicular Weight.

INTRODUCTION

The main role for broiler breeders is to be an optimal producer of fertile broiler eggs while having large size and weight which can be passed on to their offspring. Due to this selection for higher body weight and the large musculoskeletal frame, broiler breeders have been affected by greater fertility problems (Hocking, 1990; McGary et al., 2003; Bilcik et al., 2005). Flock fertility is dependent on the productive status of the birds combined with the bird's interest and capability of mating (Bagley, 1997; Bahr and Bakst, 1987). After 40 weeks of age the breeder hen needs more frequent mating to sustain high fertility, while at the same age the rooster is less interested in mating (Ottinger et al., 1983; Casanovas, 2002).

A common practice to maintain fertility levels in ageing flocks is to spike breeder flocks at 40 to 50 weeks of age. These young (spiked) males begin breeding while at the same time stimulating older males to resume mating thereby improving overall flock fertility. Spiking will assist in maintaining the optimum male to female ratio and the life-long fertility of the flock. Therefore, the purpose of this study was to compare the efficacy of different times of light stimulation on hatchability levels and testicular weight of broiler breeder males.

MATERIAL AND METHODS

In this research, 252 hundred female and 18 male Ross 308 broiler breeders were used (14:1 female to male ratio). All treatments were fed the same feed formulations for the duration of the study; only the quantity varied during the rearing period. Birds were vaccinated against Marek's disease, Newcastle disease, avian encephalomyelitis and fowl pox. At 22 weeks of age, all females were housed in three groups (pens) for a 30-week experiment. Each pen had a three equal replicate. Light stimulation was taken at 23 weeks of age. Males were maintained in separate housed for spiking purposes. Experimental groups were as follow:

Group 1: at 24 weeks of female's age, 6 males at 24 weeks of age were added to female's pens (Age of males at light stimulation was 23 wk).

Group 2: at 45 weeks of female's age, 6 males of 24 weeks of age were added to female's pens (Age of males at light stimulation was 23 wk).

Group 3: at 45 weeks of female's age, 6 males at 45 weeks of age were added to female's pens (Age of males at light stimulation was 44 wk).

Egg production was recorded daily from week 45. Hatchability data were collected weekly. At the end of the study (52 weeks of age), all males were

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euthanized and the paired testes were removed and weighed. Data were subjected to ANOVA procedures (version 11.5, SPSS Inc., Chicago, IL, 2001) to determine the Mean ±SD of hatchability levels and testicular weight. The P-value of < 0.05 was considered significant.

RESULTS AND DISCUSSION

At the time of light stimulation, all females had similar BW, with no statistical differences. And also, at the spiking time, all males had similar BW, with no statistical differences.

Hatchability levels of the control group fluctuated during the experiment (Table 1). In group 3, adding young males, increased hatchability, and it was statistically different from group 2 (P<0.05). Peak of the hatchability was highest at 50 weeks of age for group 3 (86.8%) but was not statistically different compared to group 1 (P>0.05). In a previous study used the practice of spiking, researchers reported an increase in fertility levels that lasted for 5 to 10 wk after spiking (Wilson, 1999). In group 2, after adding 45 weeks of age males, hatchability levels weren't notable. In contrast to our finding, Hocking and Bernard (2000) showed that fertility was not affected by the age of the males or females.

Table 1. Hatchability levels of broiler chicken spiked by different age of male broiler (Mean±SD)

Groups	Weeks							
	45	46	47	48	49	50	51	52
1	83.8±0.6 [a]	84.2 ±0.5 [a]	81.4 ±0.4 [a]	81 ±0.5 [a]	83.2 ±0.3 [a]	85.4 ±0.2 [a]	83.2±0.6 [a]	75.6 ±0.3 [a]
2	69.6±0.9 [b]	70 ±0.8 [b]	74.9 ±0.6 [b]	76.4 ±0.4 [b]	78.5 ±0.7 [b]	74 ±0.5 [b]	74.8±0.7 [b]	71.7 ±0.9 [a]
3	83.1 ±0.3 [a]	83.5 ±0.3 [a]	84.7 ±0.1 [a]	85 ±0.5 [c]	85 ±0.5 [a]	86.8 ±0.4 [a]	85.7 ±0.3 [a]	84.9 ±0.6 [b]

a–c Different letters in a column denote significant differences (P < 0.05); Group 1: spiking at 24 weeks of age (Age of males at light stimulation was 23 wk.), Group 2: spiking at 45 weeks of age (Age of males at light stimulation was 23 wk.), Group 3: spiking at 45 weeks of age (Age of males at light stimulation was 44 wk.).

The weights of the testes at the end of the study are shown in Table 2. No significant difference was observed in testicular weight between the treatment groups; however, testicular weight of group 3 was slightly more than the other groups (P>0.05).

Table 2. Testicular weight of (Ross 308) broiler breeder at 52 weeks of age (Mean±SD)

Groups	Testicular weight (g)
1	29±1
2	31±1
3	32±1

Group 1, 2 and 3: light stimulation was at 23 weeks of age.

The best time to spike is when the flock is at 40-45 weeks of age. The spike males must be 25-28 weeks old and should weigh 20-25% more than the average body weight of the hen flock (Sluis, 2014). Also, based on the findings of this study, it would appear that males had light stimulated at 23 weeks of age showed better effects on hatchability levels.

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