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The Effects of Feeding Time and Regimen on the Performance of Broiler Breeders: A review

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Abstract- Feeding time and regimen have the potentials to influence the performance of broiler breeder flocks and are thus of great importance. A literature review is presented concerning the responses of broiler breeders to feeding time and feeding regimen. There is a potential improvement in shell quality, egg weight and egg production that results from feeding later in the day (afternoon feeding)or from splitting daily feed allocation (split feeding). Broiler breeders are usually given a limited daily feed allowance in the morning. This practice does not supply nutrients to coincide with the hen's need.

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The Effects of Feeding Time and Regimen on the Performance of Broiler Breeders: A Review

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Abstract- Feeding time and regimen have the potentials to influence the performance of broiler breeder flocks and are thus of great importance. A literature review is presented concerning the responses of broiler breeders to feeding time and feeding regimen. There is a potential improvement in shell quality, egg weight and egg production that results from feeding later in the day (afternoon feeding) or from splitting daily feed allocation (split feeding). Broiler breeders are usually given a limited daily feed allowance in the morning. This practice does not supply nutrients to coincide with the hen's need.

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I. INTRODUCTION

Genetic selection for growth parameters in meat type chickens gives rise to a parent stock (broiler breeders) that tend to lack the ability to self-regulate feed intake. As such, their high body mass is associated with excessive fat deposition, lameness, and high mortality rate (often due to skeletal or cardiovascular disease or both). To regulate weight gain, limit health risks and also maintain high fertility for the parent stock encompass a high degree of feed restriction (Renema and Robinson, 2004). It is a common practice to feed broiler breeder flocks early in the morning, at or near the start of the photoperiod. It has been argued that this is an inefficient practice which does not supply nutrients to coincide with the hen's need Cave, (1981), and that feeding later in the day, or splitting the single feed allocation across more frequent periods throughout the day (split feeding) improves the performance of broiler breeders. This restricted amount of feed is rapidly consumed; therefore, the hens fast for an extended period of time before their next feeding resulting to improved performance. These include laying performance, shell quality, reproductive efficiency, oviposition times, birds' welfare and behavioural pattern.

II. EFFECTS OF FEEDING TIME AND REGIMEN ON EGG PRODUCTION

Onagbesan *et al.*, (2006) reported that hens with free access to feed had comparable egg with those on split fed birds in the early production period (27 to 29

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week), but their egg production decreased dramatically thereafter. Decreased egg production in broiler breeders with ad libitum feeding is well documented (Sun *et al.*, 2006, Chen *et al.*, 2006, Robinson *et al.*, 1993). Two classical studies of the effects of feeding time in laying hens Balnave, (1977); Daniel and Balnave, (1981) reported higher egg production in afternoon-fed hens than in morning-fed hens. Simon, (1973) observed a tendency for hens fed in the morning to eat smaller amounts of feed than those fed in the evening. Furthermore, Bougon, (1973) observed a greater feed intake in birds fed two hours separate meals, one in the morning and one in the evening, than birds fed a single four hours meal in the morning. Indeed in the classical studies performed by Balnave (1977) and Daniel and Balnave, (1981), the afternoon-fed hens ate more than their morning fed counterparts. Therefore, the improvements in egg production due to afternoon feeding in these studies were most likely due to increased feed intake by the afternoon-fed hens.

III. EFFECTS OF FEEDING TIME AND REGIMEN ON SHELL QUALITY

The provision of a limited daily allowance of feed in the morning may not supply nutrients to coincide with the broiler breeder hen's need Cave, (1981). This is particularly the case with Calcium (Ca), an essential component of egg shells. Shell formation normally commences in the afternoon or evening and thus utilization of dietary Ca in the morning-fed broiler breeder is poor due to the inability of these birds to meter Ca from the crop to the lower digestive tract at a uniform rate Farmer *et al.*, (1983). Feeding broiler breeders later in the day supplies dietary calcium (Ca) at times that correspond more closely to periods of shell deposition, resulting in improved calcium utilization, which is usually manifested as an increased in egg specific gravity, shell quality, shell weight and thickness Farmer *et al.*, (1983). Lewis and Perry showed that split feeding could improve shell quality.

Increased embryonic mortality, and thus reduced hatchability, is associated with eggs with a specific gravity of less than 1.080, McDaniel *et al.*, (1981). Therefore, employing a later feeding time is often viewed as a way to improve hatchability, due to the positive influence that later times have on shell quality.

IV. EFFECTS OF FEEDING TIME AND REGIMEN ON EGG WEIGHT

Spradley *et al.*, (2008) reported that broiler breeders fed twice a day laid heavier eggs than those fed once a day. They also had better overall body weight uniformity. Harms *et al.*, (1991) reported that later feeding times or split feeding results in heavier egg weight than the earliest feeding times. Therefore, there is a general trend for egg weight to increase when birds are fed later in the day, or when the daily feed allocation is spread over more frequent feeding periods.

It is unlikely that larger eggs will provide any advantage for hatching egg producers, particularly in the later stages of the production cycle, when attempts should be made to control egg size from older flocks as much as possible. However, some advantage gained from afternoon feeding during the early phases of production in order to increase the number of settable eggs from young flocks.

V. EFFECTS OF FEEDING TIME AND REGIMEN ON REPRODUCTIVE EFFICIENCY AND OVIPOSITION TIME

Farmer *et al.*, (1983) reported that volume of semen and absolute numbers of spermatozoa yielded by males were found to be highest in the afternoon. Correspondingly, mating is more frequent in the afternoon than in the morning, Cave, (1981). The distribution of mating throughout the day is affected by the ovulatory cycle, as the oviduct is not receptive to spermatozoa near the time of oviposition Cave, (1981). Most spermatozoa deposited within 1 to 3 hours prior to or just after oviposition are eliminated by vaginal contractions involved in the process of oviposition Farmer *et al.*, (1983).

VI. EFFECTS OF FEEDING TIME AND REGIMEN ON WELFARE

Numerous reports have shown that restricted fed broiler breeders experience hunger and frustration due to a high motivation for feeding Cave, (1981), Balnave, (1977) and Bougon, (1973). Split feeding offers a potential method of reducing frustration and possibly hunger, Samara *et al.*, (1996) concluded that feeding twice a day during rearing significantly improved broiler breeder welfare, at least as indicated by the parameters of hunger and frustration under study.

VII. CONCLUSION

The current commercial practice of feeding broiler breeders early in the day, at or near lights-on does not supply nutrients to coincide with the broiler hens needs. Afternoon feeding or splitting the daily feed allowance across more frequent regime may be options

to consider, as these practices lead to improvements in shell quality, egg weight and egg production.

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