A COMPARISON OF TWO FORCED MOULTING TECHNIQUES

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ABSTRACT

Two forced moulting techniques were compared in a 16-week experiment using seventy-two 20-month old AF Bosbek hybrid laying hens. In forced moulting technique-1 (FMT-1), thirty-six birds were fasted for four days and fed ground maize ad libitum from day five to day 30. In forced moulting technique-2 (FMT-2), 36 hens were fasted for ten days and fed ground maize ad libitum from day 11 to day 30. All birds on both techniques received natural daylight and water without restriction.

Moulting was more rapid and complete in birds on FMT-2 than in those on FMT-1. Post-moult hen-day egg production of hens on FMT-2 was significantly higher than that of hens on FMT-1 ($P < 0.01$) and was consistently higher during each of the twelve weekly post-moult periods considered. Mean values of egg weight, shell thickness and Haugh unit scores did not differ significantly ($P>0.05$) over the period.

KEYWORDS: Forced moulting, egg production, egg weight, shell thickness, Haugh unit score.

INTRODUCTION

In general commercial laying hens are replaced after they have been in production for about one year or when they are eighteen months old. The rate of egg production and the efficiency of feed utilization are both low beyond this period.

In Ghana some egg producers keep their hens beyond the one year period when they anticipate higher egg and/or higher spent hen prices; others are compelled to extend the laying period because they lack adequate funds for replacement stocks or because they are unable to obtain day-old chicks at the right time.

Forced or induced moulting is the process of giving a flock a rest at the end of a period of egg production so that it may perform efficiently during another cycle[1]. The methods used in inducing a moult also cause ovarian regression [2,3]

Most of these methods involve the restriction of feed, water and photoperiod[4,5,6] whilst other methods involve the use of hormones[7] or high levels of dietary aluminium or zinc[8,9] or low levels of sodium[10].

Unfortunately, in Ghana induced moulting is not commonly used either because farmers are not aware of it as a management tool or they do not know which method would be appropriate. A method suitable for Ghana should be simple to apply. Therefore a forced moulting technique involving only feed withdrawal such as the California Moulting Program[1] might be recommended. This method is suitable for hot climates as the birds are given water ad libitum to prevent dehydration.

The purpose of this work is to find a suitable easy-to-apply induced moulting programme for Ghanaian chicken farmers. It compares two simple methods based on the California Moulting Program[1].

MATERIALS AND METHODS

Seventy-two 20-month old AF Bosbek commercial hybrid laying hens were utilized in the experiment. A completely randomized block design was used with the forced moulting techniques representing the two treatment groups and the weekly periods serving as blocks. The birds were housed two to a cell in a double decker stair-stepped laying cage. Each cell measured 36 cm x 70 cm x 44 cm. The birds were fed ad libitum on a commercial layer diet containing 15% protein before and after the application of the forced moulting treatments. The eggs were collected once a day at 3 p.m.

The hens were assigned to two treatments (two

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methods of inducing moult) with 36 hens per treatment. In treatment one, forced moulting technique 1, (FMT-1), the hens were fasted for four days and then put on ground maize ad libitum from day five to day 30. In treatment two, forced moulting technique 2, (FMT-2), the birds were fasted for ten days and then put on ground maize ad libitum from day 11 to day 30. Ground maize was used during the post-fast period because it is the most common grain fed to chickens in Ghana. Water was supplied ad libitum at all times in both treatments and the birds received natural daylight throughout the period. At the end of the 30 day period all hens were returned to the commercial layer ration.

The degree of moulting on the body (excluding the loss of wing feathers) was determined by visual appraisal and the birds classified as follows:

1. Normal (no sign of moulting)
2. Tiny bare patches
3. Large bare patches
4. Extremely bare body sections

The extent of moulting of the wing feathers (primary and secondary) was determined by counting the number of feathers shed[11]. Hen-day egg production was recorded daily for each treatment and averaged over each of the twelve weekly periods. Egg weight, albumen height (Haugh Units Score) and shell thickness were measured weekly, for twelve weeks, on equal numbers of eggs collected on three consecutive days each week[5] during the post-moult period. Deaths were recorded as they occurred and post-mortem examinations were carried out on the dead birds. The data obtained were analysed by analysis of variance[12].

RESULTS

Rate of Moulting

Forced moulting technique-2 (FMT-2) caused a more rapid and a more complete moult on the body than FMT-1. Twenty-three (23) out of the 36 FMT-2 hens had either extremely bare body sections or large bare patches. The remaining 12 had tiny bare patches. Only 15 of the FMT-1 hens had extremely bare body sections or large bare patches and 21 of them appeared normal or had only tiny bare patches.

In the wing feathers moulting was less severe with FMT-1 hens than with the FMT-2 ones (Table 1). Thirteen hens on FMT-1

TABLE 1: THE NUMBER OF WING FEATHERS MOULTED (SHED) BY THE CORRESPONDING NUMBER OF BIRDS ON THE TWO FORCED MOULTING TECHNIQUES

	Number of wing feathers shed					
	0	2	4	6	8	10
FMT-1 (4- day fast)	13	7	3	6	4	1
FMT-2 (10 day fast)	2	4	8	9	9	4

did not shed any wing feathers but only two FMT-2 hens fell into this category. Seven hens on FMT-1 and four on FMT-2 shed two wing feathers each. Thirty birds on FMT-2 shed at least four wing feathers and only 14 of the FMT-1 birds were in this group.

Hen-day egg Production

The average hen-day egg production rate of all the hens was 54.7% one week before the moult period. Egg production dropped to zero on the fifth day of the forced moult period for all birds on both FMT-1 and FMT-2.

Hens on FMT- 1 were out of production for 15 days and those on FMT-2 for 24 days.

The average post-moult hen-day egg production of the hens on FMT-2 was 58.7% and this was significantly higher ($P<0.01$) than the 53.6% obtained in FMT-1 hens. Hens on FMT-2 had weekly hen-day egg production values which were consistently higher than the values recorded for those on FMT-1 (Table 2). Although birds on FMT-1 peaked earlier than those on FMT-2 they peaked at a lower level (60.3% vs 65.0%). Birds on FMT-1 had weekly hen-day egg production levels that were higher than the pre-moult level of 54.7% from the third week and fell below it after the 10th week.

TABLE 2: THE EFFECTS OF TWO FORCED MOULTING TECHNIQUES ON SUBSEQUENT WEEKLY HEN-DAY EGG PRODUCTION (%) AND EGG WEIGHTS (g).

	HEN-DAY EGG PRODUCTION		EGG WEIGHT	
WEEK	FMT-1	FMT-2	FMT-1	FMT-2
1	24.1	28.4	61.1	59.8
2	53.2	57.5	60.7	61.3
3	55.2	56.7	63.9	63.2
4	59.0	62.1	64.3	62.8
5	56.1	62.0	63.2	62.2
6	58.4	62.8	63.7	64.8
7	60.3	60.7	62.9	63.1
8	59.5	63.2	63.6	63.4
9	55.3	65.0	64.2	64.6
10	57.3	64.4	63.0	63.8
11	51.9	62.7	62.8	64.0
12	53.0	59.3	65.0	62.7

Apart from the first week post-moult, hens on FMT-2 had hen-day egg production levels which were higher than the production levels recorded for all hens during the week before the commencement of the moult experiment. This indicates that the FMT-2 birds were faster in the rate at which they increased egg production and that they were also more able in maintaining the higher rate of lay they achieved than the birds on FMT-1.

Egg Weight

The two forced moulting methods were quite similar with regard to their effect on egg weight (Table 2). The differences in egg weights were not statistically significant.

TABLE 3: THE EFFECTS OF TWO FORCED MOULTING TECHNIQUES ON SUBSEQUENT WEEKLY SHELL THICKNESS (mm) AND HAUGH UNIT SCORES.

	SHELL THICKENS		HAUGH UNIT SCORE	
WEEK	FMT-1	FMT-2	FMT-1	FMT-2
1	0.341	0.338	77.0	79.1
2	0.355	0.344	81.8	77.6
3	0.341	0.343	78.3	81.1
4	0.344	0.359	80.3	79.0
5	0.349	0.359	82.5	78.3
6	0.331	0.358	78.5	80.8
7	0.356	0.353	79.5	78.7
8	0.347	0.355	80.7	78.2
9	0.330	0.352	76.8	77.5
10	0.353	0.334	82.3	79.7
11	0.341	0.341	78.9	79.6
12	0.343	0.354	77.8	76.9

Shell Thickness

The average shell thickness over the 12 week post-moult period was 0.345 mm for FMT-1 and 0.348 mm for FMT-2 (Table 3).

Haugh Unit Scores

Table 3 shows the Haugh Unit Scores for eggs obtained from hens on the two forced moulting techniques. The differences observed were not statistically different ($P>0.05$). The average Haugh Unit Scores were 79.5 and 78.7 for FMT-1 and FMT-2 respectively.

Mortality

A total of five birds died during the experiment, three were from FMT-1 and two from FMT-2. Post mortem examinations of these birds showed that the deaths were not caused by the forced moulting methods applied.

DISCUSSION

The ten-day fast (FMT-2) was the more effective method of inducing a moult and of enhancing egg production rates (58.7% vs 53.6%) during the second cycle of lay. The more complete moult of the birds on FMT-2 is evidenced by the fact that 23 birds on FMT-2 against 15 on FMT-1 had extremely bare body sections or large bare patches. In addition 22 birds on FMT-2 as opposed to 11 on FMT-1 lost six or more wing feathers.

The consistently higher post-moult egg production levels of the birds on FMT-2 could be attributed to the longer period of rest obtained (24 days vs 15 days). North and Bell[1] asserted that the ability of a flock to produce eggs at a high rate after the moult can be attributed only to the rest period it receives. Koelkebeck et al.[13] concluded from their studies that a fasting period of ten days was more likely to produce a higher rate of lay during the post-moult period than a period of four days.

In this experiment both methods were quite effective as evidenced by the higher rates of lay recorded during the post-moult period than were recorded during the pre-moult period. Under normal conditions laying birds experience a decline in production with age once they pass the peak period of lay following commencement of lay as pullets. The effectiveness of both the four-day and the ten-day fast would explain why McCornnick and Cunningham[9] observed no differences in egg production between the two periods.

The absence of significant differences in egg weight, shell thickness and Haugh Unit Scores indicate that both methods had similar effects on egg quality parameters. This observation is in agreement with those of several workers, Hambree et al.[14], Rose and Campbell[15] and Andrew et al.[16].

CONCLUSION

FMT-2 is preferred to FMT-1 not only because of the relatively higher post-moult hen-day egg production recorded but also because of the more complete moult achieved.

ACKNOWLEDGEMENT

The author wishes to acknowledge the assistance of his colleague and friend, the late Mr. Paul Badu who did most of the field work. May his soul rest in peace.

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