Feeding whole-grain sorghum (Feteraitea) as a resting agent in egg-type breeder hens.

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SUMMARY

An experiment was carried out to investigate the use of whole-grain sorghum as a forced-resting agent for egg-type breeder hens and to determine if forced resting techniques would have beneficial effects on productive performance. hens given the high zinc, high iodine and whole-grain sorghum ceased egg production within 20, 17 and 26 days respectively . Groups given the low calcium diet required 70 days to reach the minimum level of production (less than 10 eggs/100 birds d)/ Average post-rest egg output was numerically but not significantly lower for rested birds than for the control. Neither egg weight nor Haugh units were affected by methods of forced resting. Egg shell thickness was improved ***(P*** < 0.05) in rested hens. Fertility was high whereas, hatchability was low for the rested birds. It is concluded that feeding whole grain sorghum can be used successfully to induce resting. It is a simpler technique than the conventional methods.

INTRODUCTION

An important element of cost in egg production is the depreciation of laying hens. This cost depends among others on the length of the laying period. Today's commercial egg production in the Sudan depends mainly on importation of day-old breeder and for laying stocks.

These chicks will be reared to the point of lay, and kept for 12-15 months then sold and new batches have to be imported and so on. Under the economic situation of the country forced-moulting or resting (rejuvenation) of aging hens can be practised to help in minimizing the cost of egg production.

In an attempt to establish a simpler forced-moulting technique than the conventional methods such as feeding low calcium diet, high sodium chloride diet, high iodine diet (Wakeling, 1977), high zinc diet or fasting (Charles *et al.* 1987) the present study was conducted with the following objectives :

1. To test the use of whole grain sorghum as a forced resting agent for egg-type breeder hens.

2. To determine if forced-resting have beneficial effects on productive performance of breeder hens.

MATERIALS AND METHODS

Birds and Housing

Single comb white leghorn egg-type breeder hens aged 76 weeks were used in this study. They were divided into 20 equal groups of 8 and each 8 birds were housed in a separate pen in an

open-sided deep litter poultry house. Feed and water were given ad libitum and 16h of constant light was provided throughout the experiment. The house average temperature and relative humidity ranged between 28.5-31C and 26-63.5% respectively.

Treatments and Management

There were 5 treatments with 4 replicates of each (8 birds/replicate). The treatments consisted of the following diets:- a commercial breeder diet (control) a high zinc diet (20.8 g/kg), a high iodine (5.03g/kg) a low calcium diet (3g/kg), and whole-grain sorghum. Details of the diets are given in Table (1).

All the diets except the whole-grain sorghuni were fed as mash. Before feeding the experimental diets all the birds were given the control diet for 28 days and the control group continued on the commercial breeder diet throughout the experimental period. (21 weeks). Hens on the other four treatments received their respective diets until egg production ceased or reached its lowest level (less than 10 eggs/100 birds d) as determined by the rate of egg production in three consecutive days, after which they were given the control diet until the end of the experiment (21 weeks). Egg production (eggs/100 birds d) was recorded daily and average egg weight was determined for all eggs laid on two consecutive days in each fortnight.

Haugh units, shape index and shell thickness were determined on four eggs selected at random from each replicate every two weeks. All birds were weighed at the beginning and when egg production ceased or reached its lowest level in any of

Table I. Composition (g/kg) of the Experimental diets and the whole grain-sorghum.

Ingredients	Control	High Zinc	High iodine	Low calcium	Whole grain sorghum
Ground sorghum	603	588	600	603	
Whole grain sorghum					1000
Wheat bran	160	150	156.42	260	
Sesame meal	50	50	50	50	
Groundnut meal	50	50	50	50	
Fish meal	50	50	50	30	
Oyster shell	80	80	80		
Sodium chloride	5.0	5.0	5.0	5.0	
Vitamin and minerals	2.0	2.0	2.0	2.0	
Zinc oxide		25			
Potassium iodide			6.58		
Calculated chemical Analyses					
Protein	173.8	170.5	172.9	174.8	12.5
Metabolizable energy (MJ/kg)	11.32	11.02	11.24	12.05	14.14
Calcium (kg)	34.9	34.9	34.9	3.3	0.2
Phosphorus	5.04	5.0	5.02	4.8	3.0
Zinc		20.80			
Iodine			5.03		
Methionine	3	3	3.1	30	
Iysine	6.6	6.5	6.3	6.5	

1. This premix supplied the following per kilogram of the diet:
Vitamin A, 7500 000 i.u. vitamin D, 1500 000 i. u. Vitamin B1, 1000 nig. Vitamin E, 2500 mg. vitamin b2, 2750mg. vitamin b,12 5mg, d-calcium pantothenate 5000mg Vitamin K, 1500 mg, Niacine 12500 mg, Choline chloride 60000 mg. Ethoxyguin 5000 mg. Mangenese oxide 16130 mg. Potassium iodide 353mg, cabalt sulphate 286 mg, zinc oxide 12500gm. Copper oxide 1283 mg.

the treatments. Data on feed intake was recorded weekly during feeding the experimental diets.

Cocks were introduced post-resting in a ratio of one cock per pen. Eggs were stored (12-16 C) for 5 days before incubation. A manual turning device electric incubator (Funki) with a capacity of 3840 eggs was used. Eggs of each treatment were randomly located inside the incubator. Candling of the incubated eggs was carried out in the 18th day of incubation to check out fertility and embryonic deaths. All the data generated were subjected to analysis of variance and L.S.D. (Steel and Torrie,. 1960).

RESULTS

Egg production ceased completely or reached its lowest level within 26,20 and 17 days of feeding whole grain sorghum, high - zinc and high iodine diets respectively (Table 2). production was resumed within 3 to 5 days of feeding the control diet. The low calcium diet group , required 70 days to reach the lowest level of production.

Both feed intake and body weight were reduced (P<.05) during the period of feeding the high zinc diet.

When feeding high iodine, low calcium and whole grain sorghum both feed intake and body weight were not affected. The mean rate of lay (eggs/ 100 birds d) of all treatments was below that of the control birds during the 4 weeks after giving the control diet (Table 3). The highest egg production levels (57. 1%, 63.7% and 51.9%) for high-iodine, low calcium, and high-zinc treatments respectively were reached in the third week. Hens given the whole

Table 2 Effect of dietary treatments on cessation and resumption of laying, feed intake, body weight and mortality.

Performance	High zinc (B)	High iodine (C)	Low calcium (D)	Whole grain feterita (E)
Minimum rate of lay (eggs/100 birds/d)	3.0	7.0	32.0	0.0
Days to minimum rate of lay	20	17	70	26
Number of days out of Production	3	3	0.0	**4**
Daily feed intake (g/birds)	59.1	84.4	98.9	
Body weight loss (%) During treatment	7.1			90.0
Mortality (%)	10.0	3.45	3.45	0.0

grain sorghum reached their highest level (48.1%) in egg production in the second week of giving the control diet. The dietary treatments had no significant effect of rate of egg lay, egg weight, Haugh units and mortality. The dietary treatments had a significant ($P<0.05$) effect on shell thickness and shape index.

Throughout the experiment shell thickness (mm) of eggs laid by the treated hens was higher than eggs laid by the control group. High iodine treated group produced the best egg shape

index *(P* < 0.05). Whole grain and high-zinc groups gave the highest fertility compared to the control, high-iodine and low calcium groups (Table 4). Hatchability percentage throughout seven hatches did not differ significantly among the treatments.

Table 3. The effect of treatments on other traits during the second laying phase (From 73 to 97 weeks of age).

Traits	Control	High zinc	High iodine	Low calcium	Whole grain sorghum
Mean egg weight	54.4a	54.4a	53.3a	53.7a	56.2a
(g)	±1.0	±1.1	±1.5	±1.0	±1.7
Daily feed intake	85	75.	73	73	73
(g/bird)	±5.0	±5.5	±5.2	±5.1	±5.1
Shell thickness	0.048[a]	0.054[b]	0.052[ba]	0.051[ba]	0.053[b]
	±0.034	±-0.031	±0.0202	±0.027	±0.022
Shape Index	74.2[a]	72.2[b]	75.1[a]	71.9[b]	73.1[b]
	±0836	±0877	±0.64	±0.789	±0.768
Haugh units	56[a].0	67.2[a]	67.3[a]	60.3[a]	61.6[a]
	±1.76	±1.32	±1.61	±1.67	±1.70
Mortality (%)	8.3	15.9	8.0	8.0	9.4
	±0.09	±0.1	±0.09	±0.09	±0.08
Eggs/100 birds/d	48.23a	38.53a	40.98[a]	47.83[a]	38.43[a]
	±1.681	±0.707	±2.009	±0.707	±2.356

1. These values represent the mean intake of the normal laying diet only, intake of the three experimental diets and the whole grain sorghum are shown in table (2).
Values within a line with the same superscripts are not significant at *(P* < 0.05).

Table 4. Fertility, hatchability and early embryonic death of the breeder hens.

	No. of eggs set	No. of fertile eggs	No. of chicks hatched	Fert. %	Hatc. fertile eggs	No. of embryonic death	early embryo. death
Control diet	328	218	155	66.5 ±1.469	71.7 ±1.684	63	29.0
High zinc	323	240	170	74.3 ±1.652	70.8 ±1.926	70	29.2
High iodide	306	184	111	60.1 ±2.075	60.3 ±1.961	73	39.7
Low calcium	297	169	108	56.9 ±2.094	63.9 ± 1.867	61	36.1
Whole grain sorghum	255	208	128	81.6 ±1.352	61.5 ±1.885	80	38.5

Fertility and hatchability percentages were means of seven Hatches + the standard error (S. E.)
None of the means are statistically significant at ***(P*** < 0.05).

DISCUSSION

The methods of forced-resting used in the present study did not improve post-resting egg production. This observation agrees with those of other studies in which average rate of lay of the rested hens was not improved compared to the untreated groups (Arrington *et al* 1967, Wilson *et al,* 1967, Shirely *et al.,* 1979 Abu-Serewa and Karunajeewa, 1985, Charles *et al,* 1987):

However, improved egg production post-resting has been observed by Garlich *et al.* (1984). Throughout the experimental period although not significant, rested hens consumed less feed compared to the control. There is no obvious reason to explain this reduction.

The time taken by the birds to reach their minimum rate of lay is longer than that observed by Abu-Serewa and Karunajeewa (1985). The fact that the length of this time depends on the severity and duration of the resting technique used may explain the difference.

Egg shell quality improvement post-resting is in line with the finding of Shirely *et al,* (1979). Fertility, hatchability and early embryonic death were not affected by the resting treatments although numerically, hens fed on whole grain sorghum tend to have better fertility, high embryonic death and low hatchability compared to the control. (Table 4). This may be due to the variability of values reported for these parameters because of the small number of eggs being incubated. Hatchability result is similar to that obtained by Hansen (1960). No dietary effect was

evident for mortality rate but mortality was rather erratic over resting treatments.

This study indicate that whole grain sorghum can be used successfully as an effective agent for induction of forced moulting, it is cheap, available and a simpler technique than other methods being used in this experiment.

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