PRODUCTIVITY COMPARISON AMONG FOURTEEN EGG PRODUCTION POULTRY STOCKS

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الخلاصـــة

البيانات التي تضمنتها هذه الدراسة هي من الاختبار العشوائي السابع عشر الذي يجري في جامعة تنسي في الولايات المتحدة الأمريكية التي استخدم فيه أربعة عشر قطيعـــاً من الدجاج البياض من أنحاء مختلفة من الولايات.

غذيت هذه القطعان على نوعين من العليقة إحـــداهما تحتـــوي علـــى ٠,٥% بيكاربونات الصوديوم والأخرى خالية منها.

أوضحت النتائج على أن لهذا الملح تأثيراً معنوياً ($p<0.05$) على معـــدل وزن البيضة وتأثيراً عالي المعنوية جداً ($p<0.001$) على نسبة البقع الدموية في البيض ، إضافة بيكاربونات الصوديوم أثر معنوياً ($p<0.05$) في انخفاض نسبة الوفيات .

عدة مستويات من التداخل لوحظت في هذه التجربة :

الملح ×البيكاربونات كان له تأثير معنوي ($p<0.05$) على متوسط وزن البيضة .

السلالة × الملح كان عالي المعنوية ($p<0.01$) في تأثيره على متوسط وزن البيضة والوزن النهائي للجسم إما لوحدة هو (Haugh unit) فكان التأثير معنوياً ($p<0.05$) .

أما التداخل من الدرجة الثانية (السلالة × الملـــح × البيكاربونـــات) فكـــان معنويـــاً ($p<0.05$) على متوسط وزن البيضة وعالي المعنوية ($p<0.01$) على البقع اللحمية .

ABSTRACT

The data presented pertains to seventeenth Tennessee Random Sample Laying Test wherein fourteen egg production poultry stocks were used. They were fed with and without sodium bicarbonate (0.5%), and their influence on different traits was studied. Treatment effects were found to be significant with respect to certain traits only. Low level of salt was found to influence significantly ($p< 0.05$) average egg weight whereas the increase in blood spot percentage was influenced very highly ($p<0.001$). The supplementation of Soda bicarbonate significantly ($p<0.05$) decreased mortality percentage.

Many indications of interactions were observed.

The first order interaction, salt × bicarbonate levels was significant ($p<0.05$) with respect to average egg weight. Stock × salt level interaction was highly significant ($p<0.01$) with respect to average egg weight, and so also was the final body weight and Haugh Units ($p<0.05$). Second order of interaction of stock × salt × bicarbonate for average egg weight was found to be significant ($p<0.05$), but for the meat spots, the significance level was much higher ($p<0.01$).

Introduction

The quantitative requirements of several nutrients have been shown to vary between breeds or strains of chicken. Some efforts have been made to elucidate differential responses through selection experiments carried out for a period of several generations. In some cases, genetic selection has failed to alter appreciably the requirements of strains. In other cases, many generations of selection of some strains resulted in differences among strains. There are numerous reports of commercial strain differing in requirements of certain minerals such as salt and sodium bicarbonate.

Information on response of genetically different stocks to different stocks to different dietary treatments, and subsequent effect on egg production and other egg traits is abundant.

Many investigators have discussed in detail the subject of genotype - environment interaction, (Aitken et al 1972, and Al-Mohammadi and Shirley,1974) .

Some researchers reported significant interaction effects on some economic traits (Wilson et al 1967, Christmas et al. 1973). On the other hand, some other workers including ourselves found little or no interaction with respect to other economic traits (Adams and Jackson, 1970, Al-Mohammadi and Shirley, 1974).

However, in general, some investigators on the basis of their own research results believe that such interaction is real and economically important whereas others believe that it is real but may not be of sufficient magnitude of economic importance and still a few believe it does not exist.

To shed more light, we made further investigations and report our results in this paper.

MATERIALS AND METHODS

Data used in this study were collected during the Seventeenth Tennessee Random Sample Laying Test. Hatching eggs were supplied by breeder farms, as many as 72 dozens from each stock (strain) . All entries of eggs were set in the same incubator to insure as nearly as possible, the same environment during incubation time. Moreover, uniform management was also applied during the brooding, growing and laying periods. At one day old, chicks were sexed, dubbed, wing-banded and vaccinated against Marek's, Newcastle and infectious bronchitis diseases. At 20 weeks of age, birds were vaccinated against Newcastle, infectious bronchitis and fowl pox diseases. Three hundred females of each entry were randomly taken and brooded in two pens in the brooder house where infrared heat lamps served as the source of heat during the first eight weeks. Chicks were fed 22% protein diet until eight weeks of age. At that time, each entry was divided into four pens in the grower shelter while another diet containing 17.6 protein grower diet was fed to fourteen weeks of age. Then, 16.2% proteins

grower diet was fed until twentieth week of age. Pullets were housed at 20 weeks of age, in laying cages, using 240 pullets from each stock. The 240 pullets each, each lot housed at the rate of two birds per cage. Thus, in each stock there were two lots on each of the four treatments. The four treatments were 0.5% and 0.25% of salt with and without 0.5% bicarbonate of soda. The layer diet did not contain a coccidiostat, but it was added to starter and grower diets. Rations were fed ad libitum during all 500 days of the experiment. A 14-hour-daylight was provided throughout the laying period. A randomized complete block design was applied in assigning the treatments in each block and the stocks within each treatment. Analysis of data involved analysis of variance based on a factorial arrangement of stocks, salt levels and with and without bicarbonate of soda.

RESULTS AND DISCUSSION

Results of analysis of variances of all traits studied were computed to see if the stocks, treatments and stock x treatments interaction influence are exist or not.

Strains were found to differ very highly significant ($p<0.001$) from each other with respect to egg production, average egg weight, final body weight, percentage of mortality, feed efficiency, specific gravity, Haugh Units, shell roughness, profit per hen housed, sexual maturity, percentage of small blood spots and percentage of small and large meat spots (Tables 1&2). These findings are supported, generally, by many workers (Al-Mohammadi and Shirley, 1974 and Christmas et al. 1973).

Treatments had significant effects on some economic traits, but non-significant for the others studied. Salt had significant ($P<0.05$) effect on average egg weight and very highly significant ($P<0.001$) effect on percentage of small blood spots, while bicarbonate had significant influence on percentage of mortality. On the other hand, other traits were not significantly affected by any of the four treatments.

The statistical analysis given in Table-1 indicates that the egg weight was significant ($P<0.05$) in salt-bicarbonate and stock x salt x

bicarbonate interactions, while the same was highly significant ($P<0.01$) in stock x salt interaction only. Similarly, Wilson et al. (1967) and Christmas et al. (1973) have found some kind of these interactions.

These findings indicate clearly that the genotype-environment interaction did exist but however the author suggest for elaborate further studies in this area.

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TABLE – 1

Analysis of variance of some economic traits

Source of variance	d. f.	Mean Square							
		%H. D. Prod.	Average Egg wt.	Final body wt.	% Mortality	Lbfed /Lbeggs	Spec.Gr.	Haugh Units	Shell Roughness
Block (B)	1	126.23	0. 004	--a	277.83	0.08	0. 97	0. 86	1.75
Stock(S)	13	117.8***	31.79***	0.44***	112.84***	0.25***	1.45***	61.52***	26.94***
Treatment (T)	3	9. 61	1. 36	0. 01	68. 63	0. 01	0. 04	14.92	1.60
Salt (SL)	1	--a	1 . 68*	--a	31. 08	--a	--a	--a	--a
Bicarbonate (Bi)	1	--a	0. 21	--a	174. 50*	--a	--a	--a	--a
SLXBi	1	--a	2. 20*	--a	0. 30	--a	--a	--a	--a
SXT	39	5. 97	--a	--a	35. 99	0. 01	--a	--a	--a
SXSL	13	--a	1. 09**	0. 034*	--a	--a	0. 02	7. 91*	1.01
SXBi	13	--a	--a	--a	--a	--a	0. 03	3. 56	1.18
SXSLXBi	13	--a	0. 92*	0. 01	--a	--a	0. 02	3. 96	1.35
Error	55	6.73	0. 41	0. 01	31. 86	0. 02	0. 04	3. 34	1.79
Total	111								

*P < 0. 05

**P < 0. 01

***P < 0. 001

a - This mean square was not significant. So it has been pooled to appropriate mean square or to be separated.

TABLE – 2

Analysis of variance of some economic traits

Source of variance	d. f.	Mean Square					
		Profit per hen	Sexual maturity	%Small Blood spots	% Large Blood spots	% small meat spots	% large Meat spots
Block (B)	1	1. 88	339. 51	4. 32	0. 84	0. 84	5. 58
Stock (S)	13	2.76***	108. 62***	80. 11***	6. 64	299. 31	35. 39***
Treatment (T)	3	0. 04	5. 96	65. 81	0. 88	10. 68	3. 79
Salt (SL)	1	--a	--a	175. 5***	0. 84	--a	--a
Bicarbonate (Bi)	1	--a	--a	21. 09	0. 95	--a	--a
SL x Bi	1	--a	--a	0. 82	0. 84	--a	--a
S x T	39	0. 16	7. 74	18. 22	3. 31	--a	--a
S x SL	13	--a	--a	--a	--a	9. 01	2. 15
S x Bi	13	--a	--a	--a	--a	6. 04	3. 11
S x SL x Bi	13	--a	--a	--a	--a	5. 14	9. 98**
Error	55	0. 21	14. 36	16. 95	5. 01	4. 93	3. 27
Total	111						

* P < 0. 05

** P < 0. 01

*** P < 0. 001

a- This mean square was not significant. So it has pooled to appropriate mean or to be separated .