Comparative study on local and imported strains of chicks II. equations and predicted extrapolations for economical evaluation of meat production

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COMPARATIVE STUDY ON LOCAL AND IMPORTED STRAINS OF CHICKS II. EQUATIONS AND PREDICTED EXTRAPOLATIONS FOR ECONOMICAL EVALUATION OF MEAT PRODUCTION

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ABSTRACT

A comparative study was carried out to determine the economical merit of producing broilers from local (Fayoumi), cross bred (Dokki 4) and forigen strains (Nichols) of chicks, given similar diets.

An average farm size of about 5000 chick/turn, and chicks to be marketed at a constant live weight of about 1 kg. were considered. The cost of labour and management was considered similar for the three strains of chicks, over a period of one year. As the local and the cross strains did not reach the marketing weight up to 8 weeks of age, two functions were fitted to predict

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the time needed to réach 1 kg live weight and feed intakes during this period for the three strains.

The results showed that when given similar rations, imported fast growing strains of chickens are likely to be an essemtial item for economical poultry meat production in Egypt.

INTRODUCTION

Information is scarce on the economical performance of both local or imported chickens, and on the incorporation of locally produced and processed protein sources into broiler diets.

El-Alaily et al (1981) showed clearly that Nichols chicks were more efficient than both Dokki 4 and Fayoumi chicks in terms of live weight gain, feed utilization efficiency, ready to cook weight and meat percentage.

It is not clear, however, whether or not, Nichols chicks will remain superior to Fayoumi and Dokki 4 chicks in terms of economical benifits, which is the aim of this experiment.

MATERIAL AND METHODS

A comparative study was made on the basis of the results obtained by El-Alaily et al.,(1981), in which three strains of chicks were used, mainly Nichols (N) (General poultry Company), Fayoumi (F), and Dokki 4 (D) (Poultry Research station, Ministry of Agriculture).

Assuming an average farm size of about 5000 chick/turn, and these chicks are maintained on a diet all of its protein sources were locally produced and processed (El-Alaily et al.,1981). The chicks will be marketed at a constant live weight of about 1 kg. Beside these factors, the cost of labour and management are considered similar for the three strains over a period of 1 year. Since the local strain (F) and the cross breed (D) did not reach the marketing weight (1 kg) at 8 weeks of age (El-Alaily et al., 1981) , two functions were fitted to predict the time needed to reach 1 kg. live weight and feed intakes during this period for the three strains of chicks. The following allometric relations were found to be the best fitted forms for growth, feed consumption and time needed to reach 1 kg. live body weight.

$$n_w = a\,T^b \qquad (1)$$

$$n_T = c\,F^d \qquad (2)$$

where nw denotes the estimated liver weight in kg per bird at time (T). T is the feeding period in days. F denotes the total feed (kg) per bird at time (T), a, b, c and d are the estimates of Corresponding functions.

Calculations were also made using the actual values obtained in this experiment. These calculations, were made on the basis that Fayoumi, Dokki 4 and Nichols chicks will be markted at 8, 8 and 6 weeks of age, respectively. This will consequently, increase both the number of turns/year and the number of chicks/m^2 for the three strains of chicks. The number of Fayoumi and Dokki 4/ turn was then calculated relative to the number of 5000 Nichols chicks considered as an average farm size.

RESULTS AND DISCUSSION

Table (1) shows the estimated parameters of the three sets of functions for each strain and the corresponding determination coefficient (R^2).

The results in table (1) shows the estimated parameters of both models (1) and (2) using each set of two models of a given strain for predection purposes. Table (2) shows feeding period and feed consumed to reach 1 kg live weight per chick.

The estimated time needed to reach 1 kg live weight for the three strains of chickens was nearly similar to the values obtained experimentally by Anwar et al.;(1977). These results indicate clearly the accuracy of the models used in predicting the time needed to reach 1 kg live weight.

It should be appreciated that the area reauired per chick is limited by its body weight at marketing time (Anwar et al., 1977) and the number of birds marketed per year is related to the rate of mortality.

It can be calculated that in one turn, it will be possible to produce 4850 Nichols chicks, 4800 Dokki 4 and 4675 Fayoumi chicks on the same space (Table 3).

The results presented in table (3) shows the inputs and output of a 5000 chick farm scale fed the experimental

ration. While those presented in table 4 shows costs and returns of 5000 chick farm scale.

It is evident (table 4) that the net return per year was highest for Nichols chicks (18448. 17 LE) followed by Dokki 4 (16067.81 LE) and was least for Fayoumi chicks (13182.4 LE).

The present results differed from those reported by Anwar et al., (1977) who concluded that, the local chicks were more economical than foreign strains for intensive meat production. In the present study, the three strains of chickens were given diets with similar energy and protein contents. In the study of Anwar et al., (1977), however, the local strains were given diets with lower energy and protein contents (according to their requirements) than those given to the forign strains and the cross one. This may have led to the fact that more than the required level of nutrients were given to the local strains in the present study and consequently may have masked their economical merits. Also changes in prices may have added to such contradiction. For example in the study of Anwar et al.,(1977) the cost of ration for

Fayoumi and Dokki 4 chicks were 36 LE, while it was 64 LE for Nichols chickens. According to today prices a ration similar to that of Anwar et al.,(1977) for Fayoumi and Dokki 4 will cost about 104 LE and that our ration for Nichols will be 135 LE.

Anwar et al.,(1977) compared efficiencies of the strains under a given fixed capital scale as a measure for farm size. However, the present study made the same comparison but under a fixed number of chicks per farm. It should be emphasized that, since the chicks were marketed at a constant weight of about 1 kg. liver weight in both experiments, therefore, the initial number of birds per turn should have been equal because the space needed is a function of live weight at marketing time. However, if the marketing time would be at 8 weeks of age for both Dokki 4 and Fayoumi chicks it could be possible to have more birds per unit area.

Moreover, in the study of Anwar et al.,(1977) no attention was paid to differences in mortality rates between the three strains of chicks. The present experiment showed a higher rate of mortality for Fayoumi chicks, than the other two strains (Table 3).

The above mentioned calculations were made essentially on the data obtained from extrapolations. Calculations were made, again (table 5), on the actual values and on the basis that Fayoumi and Dokki 4 chicks will be marketed at 677 and 800g. liver weight i.e. at 8 weeks of age as shown in Table (5).

It can be seen that both the number of chickens/ M^2 and the number of turns/year for both Fayoumi and Dokki 4 chicks has increased considerably. The over all net revenue was highest for Dokki 4, followed by Nichols and was least for Fayoumi (Table 6).

In this instance it was assumed that the marketing weight of both Fayoumi and Dokki 4 is acceptable by the consumer. The possible disadvantage of such practice may will be; the low ready to cook weights; the lack of automated slaughter houses to kill birds at such light weights.

In conclusion, it appears that for economical meat production from chickens to be marketed at body weights above 1.0 kg., imported fast growing strains are likely to be an essential item in poultry industry in Egypt.

If, however, marketing weights below 1.0 kg. live weight were found acceptable by the consumer, then it is possible to conclude that local strains of chicks may be considered competitive with the imported strains, provided that the above mentioned problems concerning these birds were overcomed.

It should be emphasized, however, that this work has been carried out on the post hatching performance, and more work is needed to determine the pre-hatching performance so that loose ends of such work can be tied up together.

Table (1): Estimated parameters and coefficient of determination (r^2) for the three strains.

Strains	Growth function (Model 1) liver weight gain/g		R_2	Feed consumption function (Model 2) feed consumption/g		R_2
	a	b		a	b	
Fayoumi (F)	3.4196	1.2998	0.9825	0.7791	1.8628	0.9949
Dokki 4 (D)	6.552	1.1837	0.9937	1.8717	1.6764	0.9952
Nichols (N)	5.4996	1.3853	0.9959	1.5928	1.8538	0.9924

Table (2) Estimated time needed to reach 1 kg live weight/chick and feed consumption for the three strains.

Strains	Time needed/days	Feed consumption/g
Fayoumi (F)	78.93	2665
Dokki 4 (D)	69.94	2316
Nichols (N)	42.77	1699

Table (3): Imputs and outputs of 5000 chicks farm scale.

Strain	Age* at marketing weeks	Feed consumption kgs.	No. of turn/ year	No. of chick/ turn	Mortality rate %	No.of birds at marketing	Feed consumption/ turn (tons)	Yield / turn live weight (tons)
Fayoumi	11	2.738	4.00	5000	6.5	4675	13.690	4.675
Dokki 4	10	2.316	4.30	5000	4.0	4800	11.580	4.800
Nichols	6	1.699	6.5	5000	3.0	4850	8.495	4.850

* Live weight at marketing = 1.00 kg.

Table (4): Costs and returns of 5000 chicks farm scale.

Strain	Chick* costs LE	Feed** costs LE	Chick and feed costs LE	Total*** return/turn LE	Net revenue / turn LE	Net revenue / year LE
Fayoumi	700	1848.15	2548.15	5843.75	3295.6	13182.4
Dokki 4	700	1563.30	2263.3	6000	3736.2	16067.81
Nichols	1350	1146:82	2496.82	5335	2838.18	18448.17

* Day old chick preices/LE = .14 for Fayoumi and Dokki 4, 0.27 for Nichols

** Ration price = 135 LE/ton

*** Marketing prices of kg chick (live weight) /LE = 1.25 for Fayoumi and Dokki 4
1.10 for Nichols

Table (5): Inputs and output of 5000 chicks farm scale (Figures based on experimental data.

Strain	Age at marketing weeks	Marketing weight Kg.	Feed consumption kg.	No. of turn / year	No. of chick/ turn	Mortality rate %	No. of birds at marketing	Feed consumption / turn (tons)	Yield / turn live weight tons
Fayoumi	8	.677	1.412	5.2	7385	6.5	6905	10.428	4.675
Dokki 4	8	.800	1.556	5.2	6250	4.0	6000	9.725	4.800
Nichols	6	1.00	1.600	6.5	5000	3.0	4850	8.000	4.850

Table (6): Costs and returns of 5000 chicks farm scale (Figures based on Experimental data)

Strain	Chick cost LE	Feed cost LE	Chick and feed costs LE	Total return / turn LE	Net revenue / turn LE	Net revenue / year LE
Fayoumi	1034	1408	2442	5844	3402	17690
Dokki 4	875	1313	2188	6000	3812	19822
Nichols	1350	1080	2430	5335	2905	18882

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دراسه مقارنه لبعض سلالات الكتاكيت المحليه والمستورده

٢ • دراسه اقتصاديه لانتاج اللحم باستخدام معادلات التنبأ

حسين العلايلى ـ حسين سليمان ـ ابراهيم سليمان ـ سعد الزينـــــــــــى

كلية الزراعه ـ جامعة عين شمس ، كلية الزراعه ـ الزقازيـــق

تم اجراء دراسه لمعرفة الكفاءه الاقتصاديه لانتاج اللحم من سلالات الكتاكيت محليـــــه (دقى ٤ ، الفيومى) واخرى مستورده (النيكولز) عند تغذيتها على علائق متساوية التركيب •

وافترض ان حجم المزرعه ثابت وطاقة قدرها • • • ٥ طائر فى الدوره الواحده وانـــــه يتم تسويق الفيور على وزن ثابت حوالى كيلو جرام • كذلك بافتراض ان تكاليف العمالـــه والرعايه تعتبر متساويه للسلالات الثلاثه خلال العام الواحد •

حيث ان السلالات المحليه لم تصل الى وزن التسويق المفترض (١ كيلو جرام) علـــى عمر ثمانية اسابيع لذلك تم استخدام معادلتى تنبؤ للحصول على كل من الزمن اللازم للفصـــول الى وزن كيلوجرام وكمية العليقه المستهلكه للوصول الى هذا الوزن •

كذلك تم اعادة الحسابات مره اخرى باستخدام الاوزان الحقيقيه وكمية العلف المستهلكـــه حتى عمر ثمانية اسابيع لكل من الفيومى ودقى ٤ •

واظهرت الدراسه ان النيكولز يتفوق على السلالتين المحليتان اذا تم التسويق على اوزان تزيد عن كيلو جرام • اما اذا كان وزن التسويق اقل من كيلوجرام فاظهرت الدراسه ان الدقى ٤ يمكن ان يكون منافسا للنيكولز وذلك اذا امكن التغلب على النقاط التى اثارها البحث •
