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Some Pure Bred, Crossbred and Backcross Fed Conventional and Improved Diet of Winter and Spring Hatches for Broiler Production in Egypt.

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THE NUMBER of 1600 day-old chicks of C and WPR, their cross and backcross were used to study the effect of breed, diet, and hatching season, with 100 chicks in 16 groups on a factorial design basis. Two diets and two hatching seasons were practised. Live weight, feed consumption, feed conversion and net return were studied.

The WPR was of heavier body weight than that of the other breed groups. The broilers received the improved diet were significantly heavier than the control group in the average body weight. Chicks hatched in winter were significantly heavier than those hatched in Spring. The efficiency of feed utilization was the best for the backcross followed by WPR and C breeds, respectively, while the cross bred showed the lowest efficiency. The chicks hatched in winter were better than those hatched in Spring in feed efficiency. From the economical point of view, the conventional ration showed to be more efficient than the improved ration.

The broiler industry in the world is based on parent strains from the Cornish (c) and White Plymouth Rock (WPR) breeds.

The two breeds were introduced to Egypt, in the year 1954. The performance of the pure breeds, their cross (C × WPR) and back-cross (C × (C × W PR) were studied to detect their potentiality to produce broilers under the lo- cal environmental conditions in Egypt.

Material and Methods

The present study was conducted in the Gimmizah Experimental Station Poultry Farm, Tanta, Egypt during Winter and Spring seasons, in the years 1973-1975.

The number of 1600 day-old chicks of C and WPR, their cross and back-ross (C×C × WRP), were used to study the effect of breed, dit type and hae-ching season, with 100 chicks in sixteen groups. The experiment as laid out in a factorial design basis (4 breeds and crosses × 2 diets × 2 hatching seasons).

The groups of birds were randomly and separately kept in floor brooders until the seventh week of age, then they were moved into pens till the eleventh week of age. Feed and water were provided *ad. lib.* All the birds were treated under the same managerial conditions throughout the whole experimental period.

The control or the conventional ration consisted of 19% CP and 2572 ME. Kcal./kg, versus 23% CP and 2984 ME. Kcal./kg in the improved ration. Cottonseed meal (40.6% CP) and local fish meal (40.7% CP) were used as major protein sources in the control ration, corresponding to soybean meal (49% CP) and imported fish meal (70% CP), in the improved ration.

One kg of (Pfizer) vitamin A + D_3 and 0.5 kg mineral mixture were added to each ton of the control ration, while 125 g vitamin premix +875 g mineral mixture were added to each ton of the improved ration. Each kg of the Pfizer vitamin premix added to the control ration composed of vitamin A 5000 I.U. and vitamin D_3 500 I.M., while each kg of the vitamin premix added to the improved ration composed of vitamin A 500,000 I.U., D_8 1000.000 I.U., K_3 1500 mg, E 3500 mg, B_2 3000,mg, B_2 8000 mg, and vitamin C 30.000 mg. Each kg of the Pfixer mineral premix provided in the control ration composed of : sodium chloride 990.101 mg; ferrous sulphate 6.077 mg; ferric sulphate 1.980 mg, potassium iodide 21.000 g, cupper oxide 199.000 g, potassium chloride 990.000 mg; manganese sulphate 199.000 mg. zinc oxide 100.000 mg, magnesium sulphate 199.000, sodium borate 21.000 mg and cobalt chloride 63.000 mg, while each kg of the mineral mixture provided to the improved ration composed of Fe 2 g, Mn 60 g, Cu 3 g, 1 3 g and Mn 30 g. The composition and feeding value of the experimental diet are shown in Table 1. The proximate analysis and feeding value were calculated after Erb (1976).

Live body weight, feed consumption and feed conversion were recorded during the experimental period. The costs of 1 kg feed of the two rations and the sale price for one bird were calculated according to the prevailing price in the local market. The net return values were also estimated. The statistical analysis was laid out on factorial design basis according to Snedecor and Cockran (1967).

Results and Discussion

1. *Body weight*

Tables 2 and 3 showed the effect of breed, diet, and hatching season on broilar live body weight. The body weight of C was significantly higher that the other bread groups at the first week of age . The difference in body weighn might be due to the material effect of cornish hen. The live weight of WPR was heavier than that of the other breed groups at the eleventh week of age. The results obtained on the performance of live weight of WPR, C and their cross by Ghany *et al.* (1965) were in agreement with that obtained in this work. It could be concluded that WPR might be more preferable as a broilar chick than the other breed groups used in this study.

TABLE 1. The composition and feeding value of the experimental ration (calculated after Erb, 1976).

Ingredients	Whole period control %	Broiler ration improved %
Ground yellow corn	47.50	59.00
Rice brad	10.00	5.00
Course wheat meal	10.00	—
soybean meal	—	25.00
Cotton seed meal (dect)	24.00	—
Fish meal	5.00	5.00
Molasses yeast	—	2.50
Lime stone	1.50	2.00
Bone meal	1.00	1.00
Table salt	0.50	0.50
Mineral mixture	0.50	—
Total	100.00	100.00
Cott./kg (mills)	46.00	92.00
Feeding value :	4.23	3.03
CF %	3.98	3.58
EE %		
Cp %	19.27	23.02
ME Keal./kg	2572.00	2948.00
C/p ratio	133.00	128.00

TABLE 2. Average body weight according to breed, diet and season at first and eleventh week of age.

Factors	Items	Body weight at 1st week	Body weight at 11th week
Breed . .	WPR	61.5	1068.1
	C	66.2	1043.5
	C × WPR	64.3	984.7
	C × (C×WPR)	59.3	1008.9
	L.S.D. 0.05	3.4	39.2
	0.01	4.4	51.4
Diet	Control	60.1	972.4
	Improved	65.5	1080·2
	"F" test	Sig.**	Sig.**
Season . . .	Winter	65.5	1058.7
	Spring	60.0	993.9
	"F" test	Sig.**	Sig**
	Average	62.8	1062.3

× Significant (< 0.05) XX Highly significant (< 0.01)

TABLE 3. **Values of the mean squares for live body weight at the first and eleventh week of age according to breed, diet and their interactions.**

Source of variation	d.f	Mean squane values body weight	
		at 1*st* week	at 11*th* week
Breed (B)	1	366.0**	55569.6**
Diet (D)	1	1171.8**	175742.3**
Season (S)	1	215.6**	174689.6**
B × D	3	9.0	11601.2
B × S	3	177.4	38217.2
S × D	1	0.0	2398.6
* Significant (< 0.05)		** Highly significant (< 0.01)	

The broilers received the improved diet were significantly heavier $< p <$ 0.01) than the control group in the average body weights during the successive ages of the experiment. The results obtained by Mahmoud *et al.* (1974 a, b) on Montazah broilers verified these results. It may be concluded that the improved diet containing the higher CP (23%) and ME (2984 Kcal.) was more favourable to the control diet lower in CP (19%) and ME (2572 Kcal). However, these results might contradict those recorded by Abdel Salam *et al.* (1974) and Perersen (1975). The obtained results might emphasize using the nutrient requirements recommended by Comb (1962) and Poultry World (1974).

Chicks hatched in winter were significantly heavier than those hatched in Spring. The maximum daily temperature ranged from 30 - 38° in the second season, councided with a decrease in body weight especiallly at the eleventh week of age. Similar growth depressionc in chick body weights was recorded in such climatic conditions by Ghany *et al.* (1965) and Adams *et al.* (1962).

It may be recommended to keep the chicks in the range of 24.8 - 18.7° to allow more favourable climatic conditions during the rearing period. The interaction effect of breed and crosses, diet and hatching season on body weight was not significant (Table 3).

11. *Feed conversion and net return*

The feed intake, conversion and efficiency and the net return for different studied breeds and crosses after the eleventh week of age were shown in Table 4. Estimating the number of kilograms of food required for 1 kg gain weight

TABLE 4. Feed intake, conversion and efficiency and the net return for different studied breeds and crossed after the eleventh week of age.

Breeds	WPR				C				C×WPR				C× (C×WPR)				Average			
Diets	D_1		D_2		D_1		D_2		D_1		D_2		D_1		D_2		D_1		D_2	
Seasons	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2	W_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_2	S_1	S_1
Feed intake (g) . . .	4495	4560	4310	6540	4620	4390	4755	4210	4275	3950	4980	4270	3890	3950	4200	4530	4320	4213	4561	4888
Feed conversion kg feed/kg gain . .	4.499	4.912	4.076	4.219	4.650	4.901	4.621	4.246	4.742	4.992	4.607	4.701	4.384	4.333	4.214	4.515	4.568	4.789	4·409	4.420
Feed efficiency kg gain/g feed . . .	0.222	0.204	0.245	0.237	0.215	0.204	0.216	0.236	0.211	0.200	0.217	6.273	0.228	0.231	0.237	0.221	0.219	0.209	0.227	0.226
Selling price/bird/mills	796	730	847	831	795	718	823	795	725	638	861	731	708	717	797	797	756	701	832	789
Food cost/ bird/mills	202	221	371	384	210	221	421	386	213	225	419	428	197	195	383	411	206	216	399	402
Net return /bird/mills.	594	509	476	447	585	497	402	409	512	413	442	330	511	522	414	386	550	485	433	387

at the eleventh week of age showed that the backcross was the best, followed by the WPR, the C then the C × WPR. However, the WPR may be preferred according to its heavier final body weight.

The consumption of the improved diet of high energy level (2984 ME Kcal/Rg) and CP 23.02 was higher than of the control diet of the lower energy level (2572 ME Kcal./Rg) and CP 19.27. Accordingly, the performance of growth on the improved diet was better than on control diet. The difference was nearly 190 Egyptian pounds per one ton live broilers. It may be suggested that formulating local ration in Egypt according to the recommended nutrient requirements f broiler production may be reliable for local production. In other words rations high in energy or protein level, such as the improved diet in the present study, are coincided with a decrease in net returns.

The amount of feed consumed in Spring was more than in winter hatch. However, the feed conversion in winter hatch was better than for chicks hatched in Spring. This phenomenon may be due to the favourable atmospheric temperature of the first season. Huston *et al.* (1965); Prince *et al.* (1965), Adams *et al.*, (1962) and Ghany *et al.* (1965) recorded similar results.

The WPR breed was superior than the C when fed either the improved diet or the control diet which is low in price.The backcross surpassed the crossbred in this respect either on the improved or the control diet. So, it seems better, and more economical to raise either the WPR or the backcross as local broilers according to the net return figures obtained in this study. But it is preferable to raise to the local broilers on the cheaper ration of low protein and energy levels (19% CP and ME Kcal. 2572) than raising them on higher protein and energy levels (23% CP and ME Kcal. 2948). The crosses showed the lowest net return compared to the other breed types. So, it may be concluded that raising the crosses may be expensive, meanwhile raising WPR and C may be recommended under the prevailing environmental conditions in Egypt. The two hatching seasons showed, in general, higher net return on the control diet. Conclusively, C and/or WPR may be preferred for producing meat type on the conventional ration either under the local circumstances or from the economical point of view.

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انتاج كتاكيت اللحم من بعض الأنواع الأجنبية والهجن تحت ظروف البيئة المصرية

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استخدم فى هذه الدراسة عدد ١٦٠٠ كتكوت فى عمر الفقس قسمت الى ١٦ مجموعة كل منها ١٠٠ كتكوتا وذلك من نوعى الكورنيش والبليموث الأبيض والهجين والهجين الرجعى بينها حيث كان الكورنيش هو الذكر فى الحالتين وذلك لبحث تأثير النوع وال جن والغذاء وموسم الفقس باستخدام التحليل الاحصائى المتعدد العوامل ٠ وقد كانت الكتاكيت المستعملة من فقس موسمى الشتاء والربيع حيث غذيت على عليقة محسنة وأخرى عادية ، على التوالى حتى عمر ١١ أسبوعا ٠

درست صفات النمو والكفاءة الغذائية وصافى الربح وكان البليموث اثقلها وزنا ، كما كانت الطيور التى غذيت على العليقة المحسنة أعلى معنويا عن تلك التى غذيت على العليقة العادية والطيور فقس الشتاء أعلى معنويا من تلك التى كانت من فقس الربيع وذلك فى صفة وزن الجسم ٠ كما اثبتت افراد الهجين الرجعى انها أكفأ فى الاستفادة من الغذاء ثم تلاها البليموث والكورنيش ، على الترتيب بينما كانت افراد الخليط أقلهاكفاءة وكانت الكتاكيت فقس الشتاء أعلى كفاءة من حيث الاستفادة من الغذاء عن كتاكيت فقس الربيع ومع كل ذلك فقد كان استخدام العليقة العادية أكثر كفاءة من استخدام العليقة المحسنة من الناحية الاقتصادية ٠