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Productive Adaptability of Naked Neck Chicken under Subtropical Conditions A-Meat Production

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Abstract: Crossbreeding is considered a simple approach to improve poultry productivity depending on heterosis. As such, this experiment was conducted to use this phenomenon to increase meat yield in the local strains through crossing with broiler chicken. Sharkasi chicken (Nana) and Cobb parents (CC) were used as source for fertilized eggs required in this study. All possible mating combinations between the two strains were made to produce offspring (CC, NaNa, Nana, and nana); crosses (NaC and naC) and reciprocal crosses (CNa and Cna). The obtained chicks were wing banded, brooded in a floor pens under standard environmental conditions and fed *ad libitum* during the experimental period. Body weight as well as feed consumption was recorded at 0, 2, 4, 6, and 8 weeks of age to evaluate growth performance. At the end of the experiment (8 weeks), represented birds from each genotype were taken and slaughtered for carcass measurements.

The results showed that the effect of genotypes on body weight was highly significant ($p<0.01$). At 8 weeks of age, the Cobb (CC) purebred had the heaviest body weight (1775.7 g) followed by the crosses NaC (1232.1 g), naC (1229.3 g), CNa (1095.3 g) and Cna (1021.4 g) then the other genotypes; Nana (680.9 g), nana (667.5 g) and NaNa (٦58.9 g). Feed conversion was significantly ($p<0.01$) higher in the Cobb purebred (2.03) followed by their crosses NaC (2.21), naC (2.26), CNa (2.39) and Cna (2.45) then the genotypes; nana (3.05), Nana (3.20) and NaNa (3.08 g feed / g gain). The normal feathering nana genotype had significant lowest dressing percentage when compared with the other genotypes. The Cobb purebred, crossbred and reciprocal recorded the highest major, minor Pectorals muscle, thigh and drumstick muscles percentage compared with the other local genotypes.

Key Words: Naked Neck gene (Na), Meat production, Crossing.

Introduction:

The productivity of domestic animals is a function of their genetic potential and their interaction with the environment. In Upper Egypt and especially in rural areas, native strains are adapted to stressful conditions, which include high temperature, diseases and inadequate diet. In

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this regard, the Shrakasi strain (Na) of chicken has proven to be one of the most resistant strains to heat stress compared with other local and exotic breeds (Somes 1988; Merat, 1990; Geraert *et al*. 1996; Deeb and Cahaner 1999 and Abd El- Rahman 2000). The effect of high temperature on growth performance is well documented in many species (Teeter *et al*. 1985). High temperature exerts an adverse effect on poultry productivity, especially in the hybrids with a high genetic potential (Geraert *et al*. 1996 and Gursu *et al*. 2004). On the other hand, it is well known that the naked neck gene (Na) is a single incomplete dominant autosomal gene responsible for feather loss in different areas in the body, consequently increase heat loss and improve heat resistance, (Somes, 1988; Washburn *et al.*, 1992 and Abd EL-Rahman, 2000). Furthermore, this gene (Na) showed an economic importance in feed efficiency, growth performance, carcass composition and meat yield. Cahaner *et al*., (1993); Abd EL-Rahman, (1998), and Makled and Abd EL-Rahman, (2006) found that the naked neck broilers exhibited better growth rate and meat yield than the normal feathered birds in hot conditions. Genetic improvement for heat tolerance and meat production may provide a low cost solution that is particularly attractive to developing countries with hot climates (Cahaner *et al*., 1994).

The aim of this study was to increase meat yield in Sharkasi strain through crossing with parent stock of broiler chicken under prevailing conditions in Assiut governorate.

Materials and Methods

This experiment was carried out at the poultry research Farm, Animal and Poultry Department, Assiut University in order to evaluate the presence of naked neck gene (Na) of Sharkasi chicken for meat production when crossed with broiler chicken.

Experimental Birds: Broilers Cobb parents (El-Wataneia company, Egypt), and Sharkasi local strains were used as source for fertilized eggs required in this study. Crossing between Cobb parents (CC) and Sharkasi (Nana) was accomplished to produce all possible genotype combinations according to the mating system in Table (1). At hatch, chicks were wing banded, brooded in a floor pens under standard environmental conditions and fed *ad libitum* during the experimental period, Table (2).

Table (1): Mating regimen between Cobb and Sharkasi chicken

Parent Genotype		Offspring		
Male	**Female**			
CC	**CC**		**CC**	
Nana	**CC**	**NaC**		**naC**
CC	**Nana**	**CNa**		**Cna**
Nana	**Nana**	**NaNa**	**Nana**	**nana**

Table (2): Analysis of experimental rations.

Calculated analysis of ration	Starter	Grower	Finisher
Crud protein (%)	22.08	19.9	17.57
Metabolizable energy (kcal/Kg)	3105.06	3166.69	3208.55
Crude fat (%)	5.5	5.68	5.86
Crude fiber (%)	3.21	2.99	2.9
Calcium (%)	0.97	0.89	0.8
Phosphorus (%)	0.47	0.43	0.38

Studied Traits

I-Growth measures:

Body weight (BW). The obtained chicks resulted from all genotypes were weighed individually to the nearest gram and recorded at hatch, then at two weeks intervals till 8 weeks of age.

Absolute body weight gain (BWG). Absolute body weight gains (BWG, gram/chick/day) were calculated for the periods from 0-2, 2-4, 4-6 and 6-8 weeks of age.

BWG was calculated according to the following equation:

BWG = BW2 – BW1/ P Where: BW1 is the weight at the beginning of the period.

BW_2 is the weight at the end of that period. P is the period in days (14days).

Feed consumption (FC). Feed consumption (FC) for each genotype was determined biweekly per grams and calculated on the basis of gram (feed/chick/day).

Feed to gain ratio (F: G Ratio). Feed to gain ratio (F: G ratio) was calculated for the period from 0-2, 2-4, 4-6 and 4-8 weeks of age, according to the following equation:

F:G Ratio = FC/BWG Where: FC is estimated as (g feed/chick/day), BWG is estimated as (g gain/chick/day).

II- Carcass measurements and traits. Slaughtering processing includes a series of interrelated steps in order to convert live birds into ready to cook carcass, cut up parts and/or various forms of meat products. At 8 weeks of age, a random sample of 40 growing birds from each genotype was taken to study carcass measurements traits. Birds were fasted for about 16 hours, weighed and slaughtered by cutting the jugular vein then they were left to bleed for 10 minutes. Each bird was weighted before and after slaughtering to calculate the blood weight by difference. Birds were plucked by hand after hot scalding and the weight of the feather was calculated also by the difference. The following measurements were recorded: Edible viscera weight (giblet = liver, heart and gizzard), finally the eviscerated carcasses were weighed and dissected into thigh, drumstick and breast muscles (minor and major). Weights of such organs were expressed relatively to live body weight.

Dressing percentage= (Eviscerated carcass weight + Giblets weight)/(Live body weight) X 100.

III- Statistical Analysis: Data were analyzed using general linear model (GLM) of SAS software (SAS Institute, 2009). Significant differences among genotypes means were separated using Duncan multiple range test (Duncan, 1955). The statistical model used in this experiment was as follows:-

$Y_i = \mu + G_i + E_i$. Where: Yi = observation. μ = the general population mean.

Gi = Effect of genotype (i =1, 2, 3, 4, 5, 6, 7 and 8). Ei = random error.

Results and Discussion:

I- Growth performance.

Body weight: Growth is a complex biological phenomenon depends on many factors. Information regarding growth performance is very important especially for broiler production. Such these information are used to determine the time length, amount of feed consumption, total costs and the labor required for meat production. Growth, like any trait is affected by genetic make up and environmental factors. In this study, the results of body weight for Cobb (CC), local genotypes NaNa, Nana, nana and crosses (NaC, naC) and reciprocal crosses (CNa, Cna) during the growth period are presented in table (3). At hatch, the statistical analysis showed a highly significant differences (P<0.01) between genotypes. Meantime, it is obvious that the two genotypes NaC and naC had the highest body weight compared to the other groups. These results could be partially due to the differences in egg size and maternal effect that influence body weight, (Mahmoud *et al.*, 1974a; Shalash, 1977). At 2 weeks of age, body weight of (CC) was heavier than other genotypes (Table 3). Body weight within genotypes ranged from (90.50 g) to (212.86 g) and there were highly significant (P<0.01) between genotypes (Table 3). At 4 weeks of age, body weight of (CC) was heavier than the other genotypes (Table 3) and body weight within genotypes ranged from (248.64 g) to (593.33 g). These differences in body weight were highly significant (P<0.01). At 6 weeks of age, body weight of genotypes ranged from (463.80 g) to (1193.49 g), and local genotypes NaNa, Nana and nana chicks had body weights had the lowest than other genotypes (Table 3). The (NaC), (naC), (CNa) and (Cna) chicks had an intermediate weight between both (CC) and (NaNa) chicks. Differences between all genotypes were highly significant (P<0.01) as in (Table 3).

With respect to body weight at 8 weeks of age, The local genotypes NaNa, nana and Nana had the lowest weight (658.65, 667.48 and 680.11 g) respectively, than Cobb broiler CC (1775.69 g), where their crosses were for NaC (1232.1 g), naC (1229.30 g), CNa (1095.3 g) and Cna (1021.44 g) . Differences between genotypes were highly significant (P<0.01). Ali *et al.*, (2000) reported that the broiler chicken had the higher live body weight and body weight gain than Tanzanian local chicken. Tibin and Mohamed (1990) reported significant differences between the exotic breed

(Lohman and Hybro) and indigenous chicken from hatch up to 10th weeks of age with exotic breed had the higher body weight and body weight gain compared to the indigenous chicken. Chhabrad and Sapra (1973) in comparative study between the exotic breeds (White Leghorn, Rhode Island Red and White Cornish) and the Indian native breeds (Naked neck, Assel and Bengal) found that the exotic breed were significantly ($P\leq0.01$) better in body weight than the Indian native breeds. They also found that among pure breeds Assel excelled the body weight at all ages, weighted 709 g. at 12 weeks of age. The same results were found by Sharma *et al.*, (1971) who reported that the Rhode Island Red chicken had a significantly higher body weight and body weight gain than the Indian native chicken Desi at 4, 8 and 12 weeks of age. The growth performance of exotic meat strains was better than native chicken and this is due to the fact that they are genetically improved and selected for higher body weight. The native chickens are needed to be genetically improved.

The present result indicated that the presence of Na allele associated with higher body weight compared with normal feathering birds. Higher body weights for naked neck genotypes were also reported in literature (Galal and Fathi, 2001; Fathi *et al*., 2008). The increased performance of crossbreds due to the exploitation of heterosis is well established in poultry and other avian species (Saadey *et al.* 2008; Padhi 2010; Shit *et al.* 2010). The purebreds and crossbred offspring with a particular line as sire or dam showed similar body weight trends at all ages. The results indicated that Sharkasi (Na) excelled as male line with higher body weights with other breeds. Cobb (CC) was found to be better female lines.

Table (3) Body weight ($\overline{X}\pm$S.E) at different ages of the different genotypes

Genotype	Age (week)				
	0	2	4	6	8
CC	$35.93^{b}\pm0.28$	$212.86^{a}\pm2.27$	$593.33^{a}\pm7.79$	$1193.49^{a}\pm14.26$	$1775.69^{a}\pm18.01$
CNa	$31.45^{de}\pm0.38$	$139.08^{c}\pm2.85$	$416.33^{c}\pm9.68$	$748.37^{c}\pm16.68$	$1095.25^{c}\pm21.06$
Cna	$33.27^{c}\pm0.37$	$126.72^{d}\pm2.92$	$358.61^{d}\pm10.06$	$686.10^{d}\pm16.86$	$1021.44^{d}\pm19.96$
NaC	$38.09^{a}\pm0.23$	$155.20^{b}\pm1.80$	$459.37^{b}\pm6.12$	$827.47^{b}\pm9.99$	$1232.05^{b}\pm11.65$
naC	$37.76^{a}\pm0.24$	$155.50^{b}\pm1.88$	$481.49^{b}\pm6.54$	$840.74^{b}\pm10.89$	$1229.30^{b}\pm12.85$
NaNa	$31.99^{d}\pm0.35$	$90.50^{d}\pm2.79$	$248.64^{e}\pm9.87$	$471.86^{e}\pm16.59$	$658.90^{e}\pm20.55$
Nana	$30.52^{f}\pm0.38$	$91.31^{d}\pm2.85$	$264.82^{e}\pm10.92$	$463.80^{e}\pm18.18$	$680.11^{e}\pm22.70$
nana	$30.96^{fe}\pm0.22$	$94.14^{d}\pm1.72$	$255.78^{e}\pm6.78$	$475.33^{e}\pm11.11$	$667.48^{e}\pm13.80$

Prop	0.01	0.01	0.01	0.01	0.01

[a-f] Means within the same column with the same letters did not significantly differ.

Body weight gain:

Least square means of body weight gains for the different genotypes are presented in (Table 4). It was found that gain of broiler chicks Cobb (CC) significantly ($p< 0.01$) higher than that of other genotypes NaNa, Nana and nana , where their crosses and reciprocal had an intermediate gain from hatching time to 8 weeks of age. These differences may be attributed to both maternal effect and due to the fact that Cobb (CC) commercial broiler breeder genetically had higher body weight and produce heavier egg weight than local breeds NaNa, Nana and nana chickens. This result agreed with that mentioned by Mahmoud *et al.*, (1974 a, b) and Shalash (1977).

From the present study, it could be concluded that body weight gain of the two crosses NaC and naC and reciprocal crosses CNa and Cna was better than that of other genotypes NaNa, Nana and nana chickens, but it was lower than of the broiler breeder chickens. In the same time, ♂Nana x ♀CC broiler cross was better than the reciprocal cross at the different ages. The obtained result indicated that it could be possible to improve growth performance in Sharkasi chickens by crossing heterozygous naked neck males to the commercial broiler breeder hens. This crossbreeding program will lead to benefit the maternal effect than applying the opposite cross. Similar finding were mentioned in the previous studies of Mahmoud *et al.* (1974 a, b).

Table (4): Daily body weight gain ($\bar{x}$±S.E) at different ages of the different genotypes

Genotype	Age (week)				
	0-2	2-4	4-6	6-8	Overall mean
CC	11.83^{a}±0.38	25.00^{a}±0.55	38.40^{a}±2.00	36.59^{a}±0.64	27.96^{a}±0.58
CNa	7.77^{b}±0.15	19.51^{b}±0.25	20.75^{c}±0.98	23.97^{bc}±1.09	18.00^{c}±0.31
Cna	7.56^{b}±0.41	16.03^{c}±2.20	20.76^{c}±1.53	23.38^{bc}±1.38	16.93^{c}±1.02
NaC	7.79^{b}±0.12	20.57^{b}±0.83	24.62^{b}±0.62	26.67^{b}±0.75	19.91^{b}±0.18
naC	7.86^{b}±0.15	20.74^{b}±0.44	24.87^{b}±1.02	25.53^{bc}±0.60	19.75^{b}±0.23
NaNa	4.22^{c}±0.09	8.86^{d}±0.23	15.32^{d}±1.01	14.02^{d}±0.60	10.60^{d}±0.12
Nana	4.38^{c}±0.08	10.78^{d}±0.28	14.65^{d}±0.38	14.10^{d}±0.43	10.98^{d}±0.16
nana	4.26^{c}±0.05	11.16^{c}±0.50	12.69^{d}±0.94	14.87^{d}±0.92	10.74^{d}±0.16
Prop	0.01	0.01	0.01	0.01	0.01

[a-d] Means within the same column with the same letters did not significantly different.

Feed consumption and feed conversion ratio (FCR):

Least square means of feed consumption and feed conversion ratio for the different genotypes are presented in (Table 5 and 6).

The Cobb broiler birds had highly significantly (p<0.01) consumed more than the other genotypes from one day old up to 8 weeks of age. The increase in feed consumption of Cobb (CC) broiler and crossbred and reciprocal cross chicks may be attributed to the rapid growth or weight gain of the broiler chicks which appeared to be the major factor increasing feed consumption as Ellen *et al.*, (1973) concluded.

Table (6) presented the overall mean feed conversion for the genotypes during the experimental period. The feed conversion was significantly better (P<0.01) for the Cobb (CC) broiler than other genotypes. The better feed conversion for Cobb broiler may be due to the good genetic constitution for growth and feed conversion ratio, where the crosses (NaC and naC) and reciprocal cross (CNa and Cna) had better feed conversion ratio compared to local genotypes (Nana, Nana and nana). These results may be attributed to heterotic effects.

In general, the higher growth rate with lower feed consumption and better feed efficiency of the naked neck broilers in most of the cases than normally feathered birds may be due to decreased feathering and thereby having better thermo-regulatory efficiency and increase heat tolerance. The reduction in feather mass prevents an excessive increase in body temperature caused by eating and digestion at high ambient temperature, which minimizing the negative effect of hot climate on feed consumption, growth and meat yield. The naked neck broilers by virtue of the more exposed skin are able to dissipate heat in a better way and thereby food intake is also more. Bordas *et al*. (1980), Fathi *et al*. (1993), Singh *et al*. (1996) and Yalcin *et al*. (1997b) reported similar findings.

Table (5): Daily feed consumption ($\overline{X}$ ±S.E) at different ages of the different genotypes

Genotype	Age (week)				
	0-2	2-4	4-6	6-8	Overall mean
CC	20.52^{a}±0.54	50.50^{a}±1.82	73.19^{a}±1.40	82.43^{a}±0.81	56.66^{a}±0.47
CNa	17.07^{c}±0.53	38.74^{c}±1.59	49.97^{c}±1.50	53.74^{d}±0.95	39.88^{c}±0.60
Cna	19.10^{b} ±0.48	41.96^{bc}±1.06	54.62^{b}±1.65	60.96^{c}±0.37	44.16^{b}±0.20
NaC	16.55^{c}±0.31	44.19^{b}±0.55	53.37^{bc}±0.75	60.64^{c}±0.66	43.69^{b}±0.33
naC	18.32^{b}±0.24	44.30^{b}±0.59	53.52^{bc}±1.13	63.93^{b}±0.97	45.02^{b}±0.49
NaNa	13.97^{d} ±0.16	28.51^{e}±0.64	42.32^{d}±0.86	46.28^{ef}±1.79	32.77^{e}±0.37

Nana	14.32^{d} ±0.26	33.32^{d}±1.21	38.55^{e}±0.40	45.07^{f}±0.39	32.81^{e}±0.30
nana	14.47^{d}±0.21	34.11^{d}±1.21	42.78^{d}±0.76	49.11^{e}±0.74	35.12^{d}±0.54
Prop	0.01	0.01	0.01	0.01	0.01

$^{a-f}$ Means within the same column with the same letters did not significantly different.

Table (6): Effects of genotypes on feed conversion ratio (g feed / g gain)

Genotype	Age (week)				
	0-2	2-4	4-6	6-8	Overall mean
CC	1.74^{d}±0.07	2.02^{d} ±0.09	1.93^{d}±0.08	2.25^{c}±0.05	2.03^{e}±0.02
CNa	2.28^{bc}±0.10	2.64^{b}±0.27	2.49^{cd}±0.21	2.35^{c}±0.16	2.39^{bc}±0.12
Cna	2.45^{b}±0.05	2.15^{c}±0.04	2.65^{bc}±0.15	2.56^{c}±0.11	2.45^{b}±0.04
NaC	2.10^{c}±0.03	2.13^{c}±0.04	2.18^{cd}±0.09	2.38^{c}±0.05	2.21^{d}±0.02
naC	2.35^{b}±0.03	2.19^{c}±0.07	2.18^{cd}±0.05	2.41^{c}±0.05	2.26^{c}±0.02
NaNa	3.31^{a}±0.05	3.22^{a}±0.15	2.80^{ab}±0.21	3.30^{a}±0.11	3.08^{a}±0.02
Nana	3.36^{a}±0.07	2.99^{ab}±0.06	3.08^{a}±0.20	3.06^{b}±0.20	3.05^{a}±0.06
nana	3.31^{a}±0.07	3.17^{a}±0.10	2.93^{ab}±0.09	3.51^{a}±0.11	3.20^{a}±0.04
Prop	0.01	0.01	0.01	0.01	0.01

$^{a-d}$ Means within the same column with the same letters did not significantly different.

II-Carcass Measurements: Results of the percentages and statistical analysis of the offal's and giblets are presented in Tables (7).The results showed no significant differences in blood percentage between genotypes . It is well known that the total blood volume represents about 10% from the body weight and approximately 3-5% bleed after killing the bird. In our study, no clear trend in blood percentage was obvious related to body weight and it ranged from 2.66 – 3.18% in the nana and naC genotype, respectively. These differences in blood percentages may be due to the dissimilarity in bleeding time, cutting area and/or the consciousness of the animals during slaughtering time. Also, the higher blood proportion associated with presence of (C) gene in most of the genotypes in this experiment may be increased blood supply reached to organs and muscles to meet the higher growth rate in these strains (Luger *et al*., 1998 and Raju *et al.,* 2004).

The present results showed that the (nana) normal feathering had higher feather percentage compared to the other genotypes, where the differences between genotypes were highly significant (Table 7). The naked neck gene (Na) is a genetic mutant with approximately 40% reduced feather coverage when presents in homozygous form (NaNa) and approximately reduced 30% feathers when it exists in heterozygous form (Nana), Bordas *et al*., (1978). Likewise, Touchburn *et al.,* (1980) suggested that the reduction feathering associated with Na gene increased bird's flexibility in regulating their body temperature (BT) at high ambient temperature. The main effect of naked neck gene is the reduction of the whole feather percentage especially in neck and breast areas by about 30-40% compared to the normal feathering chickens (Mérat, 1986 and Horst and Rauen, 1986).

The heart and liver play an important role in metabolic activity of poultry, Galal (2008). Table (7) showed that the total giblets percentages were 6.03, 5.66, 5.64, 5.44, 5.41, 5.36, 5.11 and 4.44 % for NaNa, Nana, nana, NaC, CNa, Cna, naC and CC broiler, respectively. Highly significant differences (P<0.01) in giblets percentages were found between all genotypes, (Table 7). From the obtained result, it was observed that Sharkasi and crossbred had higher heart, liver and gizzard percentage due to their higher biological activities than the other genotypes Abdellatif *et al.*, 1987. Also, Rajkumar *et al.*, (2010 a, b and 2011) reported that the high liver and heart percentage in the naked neck genotypes may be correlated with high metabolic rate in these strains.

Table (7): L.S. means ± S.E Offal's, and giblets percentages of the different genotypes.

Genotype	Blood (%)	Feather (%)	Heart (%)	Liver (%)	Gizzard (%)	Giblets (%)
CC	2.96^{a} ±0.22	6.19^{bc}±0.20	0.43^{d} ±0.01	2.15^{c}±0.06	1.86^{d}±0.05	4.44^{d}±0.11
CNa	3.03^{a}±0.21	5.79^{c}±0.20	0.45^{bcd}±0.0	2.38^{ab}±0.06	2.58^{c}±0.08	5.41^{b}±0.13
Cna	3.08^{a}±0.12	6.64^{b}±0.18	0.44^{cd}±0.01	2.46^{a}±0.05	2.46^{c}±0.06	5.36^{bc}±0.08
NaC	2.79^{a}±0.20	5.90^{c}±0.20	0.42^{d}±0.01	2.48^{a}±0.08	2.53^{c}±0.07	5.44^{b}±0.10
naC	3.18^{a}±0.21	6.66^{b}±0.19	0.43^{d}±0.011	2.25^{bc}±0.042	2.42^{c}±0.058	5.11^{c}±0.07
NaNa	2.89^{a}±0.16	6.63^{b}±0.33	0.49^{ab}±0.013	2.52^{a}±0.05	3.01^{a}±0.06	6.03^{a}±0.09
Nana	2.73^{a}±0.17	6.67^{b}±0.20	0.49^{abc} ±0.01	2.40^{ab}±0.05	2.89^{ab}±0.05	5.66^{b}±0.08
nana	2.66^{a}±0.12	8.35^{a}±0.25	0.48^{a}±0.01	2.24^{cb}±0.03	2.77^{b}±0.05	5.64^{b}±0.06
Prop.	N.S	0.01	0.01	0.01	0.01	0.01

$^{a-f}$ Means within the same column with the same letters did not significantly differ.

Dressed Carcass weight and percentage: The crossbred (NaC) chicks recorded the highest dressing percentage (70.22 %), while the lowest dressing percentage was recorded for nana (67.63 %). The other genotypes were recorded an intermediate percentage (Table 8). The differences between genotypes were highly significant (P<0.01). These results were in full agreement with Abdellatif (1989) who found that local Dandarawi chicken had inferior carcass traits than broiler types. The increase in carcass percentage of Cobb (CC) broiler and crossbred chicks attributed to the rapid growth and weight gain of the broiler as a hybrid strains, Ellen *et al.*, (1973). When the dressing percentage was compared between the Na genotypes and the pure normal feathering (nana) genotype, the superiority of the former one was observed. The higher meat yield due to the presence of Na gene is well established (Deeb and Cahaner, 1999; Yalcin *et al.*, 1999; Fathi and Galal, 2001 and Fathi *et al*., 2008).

Cut up parts: The Cobb purebred broiler chicks recorded the highest major Pectorals muscle percentage compared to other genotypes (NaNa, Nana and nana) and the crosses were intermediate. Differences between genotypes were highly significant (Table 8). Similar trend was observed for the minor pectorals muscle. Also, the statistical analysis showed highly significant differences (P<0.01) between genotypes in thigh muscle percentage where the Cobb (CC) purebred chicks recorded the highest thigh percentage. However, there was no significant differences between purebred crosses and reciprocal crosses for the relative drumstick muscle percentages (Table 8).

Generally, it could be concluded from the present experiment and several other studies that the increased percentage of edible muscles related to Na genotypes might be due to the availability of higher levels dietary protein for muscle development with less protein requirement for plumage development (Merat, 1990). Fathi *et al.*, (2008) observed significantly higher breast yields in naked neck genotypes under high ambient temperatures. Similarly, better meat yield in naked neck genotypes was also reported by Yalcin *et al.*, (1997a).

Table (8): Edible meat parts percentage ($\overline{X}\pm$S.E) of the different genotypes.

Genotype	Thigh muscles (%)	Drum muscles (%)	Pectorals Major (%)	Pectorals Minor (%)	Dressing (%)
CC	$3.87^{a}\pm0.07$	$3.09^{ab}\pm0.07$	$4.77^{a}\pm0.10$	$1.92^{a}\pm0.09$	$70.06^{a}\pm0.67$
CNa	$3.74^{ab}\pm0.05$	$3.10^{ab}\pm0.05$	$4.14^{c}\pm0.08$	$1.62^{cb}\pm0.03$	$70.10^{a}\pm0.28$
Cna	$3.66^{ab}\pm0.04$	$3.07^{ab}\pm0.05$	$4.00^{c}\pm0.01$	$1.52^{cd}\pm0.03$	$70.06^{a}\pm0.43$
NaC	$3.69^{ab}\pm0.05$	$3.08^{ab}\pm0.03$	$4.48^{b}\pm0.14$	$1.72^{b}\pm0.07$	$70.22^{a}\pm0.41$
naC	$3.66^{b}\pm0.04$	$3.05^{ab}\pm0.09$	$4.18^{c}\pm0.07$	$1.54^{cd}\pm0.03$	$68.99^{ab}\pm0.37$
NaNa	$3.73^{ab}\pm0.06$	$3.17^{a}\pm0.05$	$3.66^{d}\pm0.05$	$1.48^{cd}\pm0.02$	$69.95^{a}\pm0.30$
Nana	$3.83^{ab}\pm0.04$	$3.22^{a}\pm0.03$	$3.64^{d}\pm0.04$	$1.45^{d}\pm0.01$	$69.45^{a}\pm0.76$
nana	$3.43^{c}\pm0.04$	$2.99^{b}\pm0.03$	$3.54^{d}\pm0.06$	$1.42^{d}\pm0.02$	$67.63^{b}\pm0.66$
Prop	0.01	N.S	0.01	0.01	0.01

$^{a\text{-}d}$ Means within the same column with the same letters did not significantly different.

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الأقلمة الإنتاجية للدجاج عاري الرقبة تحت الظروف شبة الأستوائية

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يعتبر الخلط وسيلة بسيطة لتحسين الأداء الإنتاجي للطيور والتي تعتمد علي قوة الهجين. إستخدم في هذه الدراسة الشكل المظهري كوسيلة لتحسين إنتاج اللحم في الدجاج المحلي عن طريق الخلط بين آباء وأمهات دجاج اللحم من سلالة Cobb(CC) مع الدجاج الشركسي الخليط (Nana) . تم إستخدامهم كمصدر للحصول علي البيض المخصب من جميع التزواجات الممكنة بين السلالاتين و للحصول علي كل من التراكيب النقية وهي (CC, NaNa, Nana,nana) و الخلطان(NaC, naC) وكذلك الخلطان العكسية(CNa, Cna). الكتاكيت الناتجة للتراكيب الوراثية المختلفة تم ترقيمها وتربيتها في عشش أرضية تحت الظروف الرعائية الطبيعية السائدة وذلك لمعرفة تأثير جين الرقبة العارية علي النمو وصفات الذبائح. تم قياس وتسجيل معدل النمو وكمية العلف المستهلكة في عمر يوم – ٢- ٤- ٦- ٨ أسبوع من العمر وذلك لتقيم أداء النمو. وفي نهاية التجربة عند عمر ٨ أسابيع تم ذبح ٤٠ طائر من كل تركيب وراثي وأظهرت النتائج ما يلي:

١- أن تأثير التركيب الوراثى علي وزن الجسم كان معنوي جداً. في عمر ٨ أسابيع وسلالة Cobb كان لها أعلي وزن جسم (١٧٧٥.٧ جرام) يليه الخلطان NaC ، Cna، CNa،naC (1232.1، ١٢٢٩.٣، ١٠٩٥.٣و١٠٢١.٤ جرام)علي الترتيب ثم يلي ذلك في الوزن Nana، nana و NaNa (٦٨٠.٩، ٦٦٧.٥ و ٦٥٨.٩ جرام) علي الترتيب.

٢- أظهرت كفاءة التحويل الغذائي للطيور Cobb إرتفاعاً معنوياً يلي ذلك الطيورالخلطان ثم طيور الشركسي.

٣- أظهرت الطيور الطبيعية التريش من السلالات المحلية nana أقل نسبة تصافي بالمقارنة بالتراكيب الوراثية الأخري. كما أن طيور Cobb كان لها أعلي نسبة من العضلات الصدرية الصغري والكبري والفخذ والدبوس مقارنة بباقي التراكيب الوراثية المحلية.