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EFFECT OF NAKED NECK GENE (NA) ON GROWTH AND CARCASS MEASUREMENTS IN LOCAL SHARKASI MALES UNDER ASSIUT CONDITIONS

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SUMMARY

Data of 225 males from three genotypes, normally feathered (nana), heterozygous naked neck (Nana) and homozygous naked neck (NaNa) were used to evaluate the effect of naked neck gene (Na) on growth and carcass measurements. The results obtained were as follow:

1. Body weight of the naked neck birds (Nana, NaNa) were heavier than that of nana once at hatch and at four weeks of age, but the differences between genotypes were insignificant.
2. The Nana genotype was heavier than nana genotype by about 9.4%, 15.50% and 19.70% at 8, 12, and 16 weeks of age, respectively. The corresponding figures for NaNa were 4%, 6.4%, and 8.9%, respectively. The differences between genotypes were highly significant ($P<0.01$).
3. The Na gene improved growth rate. Regardless to naked neck feathering type (Nana or NaNa) the improvement was about 3%, 3.85%, and 3.05% at that periods 4-8, 8-12 and 12-16 weeks of age, respectively. The differences between genotypes were highly significant ($P<0.01$) whereas the differences between genotypes from 0-4 or 0-8 weeks of age were insignificant.
4. The Na gene reduced significantly ($P<0.01$) feather weight (g) and percentage (%). The reduction in feather weight was 23.5% and 39% in Nana and NaNa genotypes, respectively.
5. The Na gene caused a reduction in neck weight or percentage.
6. The Na gene improved the weights and percentages of breast, thighs, wings, carcass and giblets. The dressing percentages were 76.9%, 76.2%, and 70.8% in Nana, NaNa and nana genotypes, respectively. The differences between genotypes were highly significant ($P<0.01$).

7. The Na gene improved meat weight and the percentage of breast and thighs. The differences between genotypes were highly significant ($P<0.01$).
8. The naked neck birds exhibited a reduction in head and shanks percentages, and also a reduction in bones length (femur, tibia and keel).

The present study exhibits an additional advantage of Na gene in small body weight populations.

Keywords: Poultry, naked neck (Na), body weight, growth rate, meat yield

INTRODUCTION

The naked neck gene (Na) is widespread in unselected local populations and known as Sharkasi chickens at various areas in Assiut.

The naked neck gene (Na) was associated with resistance to heat stress as measured by survival (Smith and Lee, 1977; Horst and Rauen, 1986; Merat, 1986 and Abdel-Rahman, 1990). This gene may have an advantage in growth rate response and meat yield under moderate conditions and more pronounced under heat stress (Merat 1990; Eberhert and Washburn, 1993 a,b; and Cahaner *et al.*, 1993).

The effect of Na gene on growth performance have been reviewed by Merat (1986, 1990). At 21°C or lower, the differences due to Na gene were inferior for growth and feed efficiency (Fraga, 1982 and Hanzl and Somes, 1983). At 25°C growth differences due to Na gene were insignificant and the disadvantages of naked birds for feed efficiency at lower temperatures did not appear in chicks (Zein El-Dein *et al.*, 1984). At 30°C or above homozygous (NaNa) or heterozygous (Nana) naked birds showed a marked advantage for body weight, and it was less for heterozygous (Nana) genotype as compared with normal feathered (nana). Their feed efficiency seemed slightly better although insignificant (Monnet *et al.*, 1979; Hanzl and Somes, 1983; Merat, 1990; Cahaner *et al.*, 1992 & 1993 and Eberhart and Washburn, 1993b).

Finally, the Na gene advantage under heat stress was more pronounced in rations with low protein level (Zin El-Dein *et al.*, 1984 and Merat, 1986) or in large body weight populations (Merat, 1986; Eberhert and Washburn, 1993b).

Regarding to carcass and meat yield, an increase in naked neck birds carcass as compared with normal feathering (nana) sibs as reported by Monnet *et al.* (1979); Hanzl and Somes (1983); El-Atar and Merat (1985); Merat (1986&1990); Cahaner *et al.* (1992&1993) and El-Atar and Fathi (1995).

Merat (1986) shows that the reduction of plumage due to naked neck gene (Na) improved carcass yield in two ways, firstly increasing slaughter yield (1.5-3%) secondly an increase in meat yield of dressed carcass (2-7%) according to the population studied as a result from a higher proportions of naked neck

chicks muscles in pectoral region (Cahaner *et al.*, 1993 and El-Atar and Fathi, 1995).

The experiment was designed to study the effects of the naked neck gene (Na) on growth and carcass measurements of Sharkasi males raised under Assiut environmental conditions.

MATERIALS AND METHODS

The present study was carried out at the Poultry Research Farm, Assiut University. A brown heterozygous naked neck (Nana) males and females were mated to produce the offspring segregations for all the three genotypes in this study:

1- Homozygous naked neck (NaNa) genotype.
2- Heterozygous naked neck (Nana) genotype.
3- Normal feathering (nana) genotype.

The difference between the homozygous (NaNa) and heterozygous (Nana) naked neck genotype was determined according to Crawford (1976) who reported that the heterozygous (Nana) birds had an isolated tuft of feather on the ventral side above the crop, while the homozygous (NaNa) had no throat tuft, which consists of very few pin feathers or small feathers. He assumed that such genotype of chicks could be determined by the presence or absence of the tuft.

The gene effect in homozygous (NaNa) or heterozygous (Nana) naked neck birds was calculated according to Yalcin *et al.* (1997) as follow:

$$\% \text{ gene effect (Na / -)} = \frac{\{(\text{Na1-}) - \text{nana}\}}{\text{nana}} \times 100$$

A total number of 225 males (75 males from each genotype) were used for the statistical analysis. The genotypes were kept as a basic stock in Assiut Poultry Research Farm.

The new hatched chicks for each genotype were wing banded, reared on floor pens until 16 weeks of age. They were fed *ad lib* on basal ration as recommended. Unlimited water and optimal light and temperature were provided through the period from hatch to 8 weeks of age. From May-June, 1994 (8-16 weeks of age) the birds were reared under Assiut natural environmental conditions (20-30°C and relative humidity ranged from 50-60%).

The birds were weighed individually with four weeks intervals and growth rates were estimated from 0-4, 4-8, 0-8, 8-12 and 12-16 weeks of age.

At the end of the 16 weeks of age, a random sample of 30 males from each genotype was taken to study carcass measurements traits. Each bird was weighed before and after slaughtering to calculate the blood weight by

difference. The birds were plucked by hand after hot scalding and the weight of feather was calculated also by difference. Carcass, giblets, the different parts of the carcass, breast and thighs meat were weighed and recorded separately. The length of femur, tibia and keel bones to the nearest cm were also recorded. All the data of carcass measurements were expressed as absolute records (g, cm) and as a percentages of live body weight. Records from individually 30 males for each genotype were used for statistical analysis.

All data were analysed by using the General Linear Models Procedure (G.L.M.) of SAS software (SAS Institute, 1990) by the following model:-

$$Yij = M + Gi + Eij$$

where Yij is the observation of the i th bird in the j th genotype, M is the general population mean, Gi is the effect of genotype and Eij is the random error.

RESULTS AND DISCUSSION

A- Body weight and growth rate:

Data of body weight and growth rate for all genotypes are presented in Table (1).

Although the naked neck and normally feathered birds were originated from the same parents, the body weight of the naked neck birds (Na/-) was greater than the normally feathered (nana) birds at all ages.

At hatch or 4 weeks of age, body weights for the naked neck birds (Na/-) were larger than the normally feathered (nana) sibs but the differences between the genotypes were insignificant (Table 2). Body weight for the naked neck birds was more pronounced thereafter (Table 1, Fig. 1).

At 8 weeks of age, the average body weight of Nana and NaNa genotypes surpassed that of nana genotype by about 9.40% and 4.0%, respectively. Similar trend was also obtained at 12 weeks of age and body weights were 1098 g, 1012 g and 951 g in Nana, NaNa and nana genotypes, respectively.

At 16 weeks of age, the differences between genotypes were more pronounced than the former ages. Body weight of Nana and NaNa genotypes were heavier than nana genotype by about 19.70% and 8.90%, respectively.

Table (2) showed insignificant differences between genotypes at hatch or at 4 weeks of age whereas, these differences were highly significant ($P<0.01$) at 8, 12 and 16 weeks of age.

The data indicated that the Nana performed better than NaNa or nana and this is in agreement with the findings of Cahaner *et al.* (1992& 1993) who reported that the heterozygous naked neck (Nana) broilers gain about 3% more weight than their normally fathered (nana) sibs under commercial conditions during spring and summer months in Isreal. This advantage

Table 1.Means and standard errors (X± S.E.) of growth traits in naked neck (Na/-)* and normal feathering (nana) males from hatch to 16 weeks of age

Traits	Genotypes**			% Na gene Effect		Significance
	Nana (N=75)	NaNa (N=75)	nana (N=75)	Nana	NaNa	
Body weight (g)						
At hatch	30.60±0.26	30.24±0.32	29.98±0.31	2.07	0.87	N.S.
4 weeks	210.40±3.80	204.20±2.95	202.50±2.40	3.90	0.85	N.S.
8 weeks	659.10±6.90 ^{a}	626.50±8.40 ^{b}	602.70±5.90 ^{c}	9.35	3.95	H.S
12 weeks	1098.20±11.20 ^{a}	1011.70±10.85 ^{b}	951.10±9.80 ^{c}	15.47	6.39	H.S.
16 weeks	1385.00±11.10 ^{a}	1260.20±11.40 ^{b}	1157.30±9.00^{c}	19.67	8.89	H.S.
Growth rate (%)						
0-4 wks	148.45±0.75	147.40±0.60	147.40±0.50	1.15	-	N.S.
4-8 wks	103.10±1.10 ^{a}	101.30±0.70 ^{ab}	99.20±0.80 ^{b}	3.90	2.10	H.S.
0-8 wks	181.60±0.48	181.05±0.60	180.30±0.60	1.30	0.75	N.S.
8-12 wks	48.56±0.60 ^{a}	46.60±0.70 ^{a}	43.70±0.65 ^{b}	4.85	2.90	H.S.
12-16 wks	22.35±0.70 ^{a}	21.40±0.60 ^{a}	19.20±0.60 ^{b}	3.95	2.20	H.S.

(Na/-)* Heterozygous naked neck (Nana) or homozygous naked neck (NaNa).

** Means within rows with no common superscripts differ significantly (P<0.05).

H.S. Highly significant (P<0.01).

N.S. Not significant

Table 2. Mean squares values (M.S) of growth traits in naked neck (Na/-) and normal feathering (nana) males from hatch to 16 weeks of age

		M.S. values of body weight (g)				
Source of variation	d.f.	At natch	4-wks	8-wks	12-wks	16-wks
Genotype	2	6.49 N.S.	1288.75 N.S.	59978.75**	409761.30**	973097.45**
Error	222	6.70	725.00	3801.80	8486.16	8326.70
		M.S. values of growth rate (%)				
Source of variation	d.f.	0-4 wks	4-8 wks	0-8 wks	8-12 wks	12-16 wks
Genotype	2	28.41 N.S	290.70**	32.10 N.S	442.50**	199.44**
Error	222	29.10	58.70	27.50	39.50	30.30

** Highly significant (P<0.01)
N.S. Not significant.

appeared to be larger in males than females and more pronounced with advance of age especially at high temperature.

Regardless to naked neck feathering type (Nana or NaNa), the presence of naked neck gene (Na) improved body weight by about 2.40%, 6.65%, 10.95% and 14.30% at 4, 8, 12 and 16 weeks of age, respectively. This is in agreement with the results obtained by Zein El-Dein (1981); Horst (1982); Abdel-Rahman (1990); Eberhart and Washburn (1993b); Cahaner *et al.* (1992& 1993) and El-Hammady *et al.* (1995).

Concerning the effects associated with the Na gene on growth rate, Table 1 exhibited also that the naked neck genotypes (Na/-) performed better than their normally feather (nana) sibs. The differences between genotypes for growth rate from 0-4 weeks or 0-8 weeks of age were insignificant (Table 2).

At 4-8, 8-12 and 12-16 weeks of age the naked birds (Na/-) grew significantly faster than the normally feathered (nana) genotype. Growth rate at 4-8 weeks was about 103%, 101% and 99% in Nana, NaNa and nana genotypes, respectively.

At 8-12 weeks of age, the presence of naked neck gene (Na) improved growth rate by about 4.85% and 2.90% in Nana and NaNa genotypes, respectively. Similar trend was also obtained at 12-16 weeks of age and the growth rate, were about 22.40%, 21.40% and 19.20% in Nana, NaNa and nana genotype, respectively.

Table (2) showed a highly significant differences ($P<0.01$) between genotypes for growth rate at 4-8, 8-12 and 12-16 weeks of age. The former result is in agreement with the findings of El-Deeb (1980) in Dandrawi chickens under Assiut environmental conditions and Shebl *et al.* (1995).

Regardless to the naked neck feathering type (Nana or NaNa), the naked neck gene (Na) improved growth rate by about 3%, 3.85% and 3.05% at 4-8, 8-12 and 12-16 weeks of age, respectively.

B- Carcass measurements:

Data of carcass measurements as absolute values (g& cm) or percentages of live body weight are presented in Tables 3 and 4.

As might be expected there were a significant reduction in feather weight (g) or as a percentage (%) from live body weight associated with the Na gene. Compared with nana birds, the Nana and NaNa had less feather weight by about 23.50%, and 39%, respectively. This result is in agreement with the findings of Monnet *et al.* (1979); Zein El-Dein (1981); Hanzl and Somes (1983); Zein El-Dein *et al.* (1984) and El-Atar and Merat (1985).

As reviewed by Merat (1986) the reduction of feather proportion to live body weight was 1.5-2% and 2-2.50% for the Nana and NaNa genotypes, respectively. In this study the reduction was about 1.60% and 2.20% for the Nana and NaNa, respectively (Table 4).

Table 3. Means and standard errors (X± S.E.) of carcass measurements (absolute values) in naked neck (Na/-) and normal feathering males (nana) at 16 wks of age.

Variable	Genotypes*			%Na gene Effect		Significance
	Nana (N=30)	NaNa (N=30)	nana (N=30)	Nana	NaNa	
Body weight (g)	1424.40±26 [a]	1380.30±28 [a]	1284.30±32 [b]	10.90	7.47	H.S.
Blood (g)	62.23±1.60	58.90±1.80	57.60±2.0	8.00	2.30	N.S.
Feather (g)	49.48±2.15 [b]	39.50±1.65 [b]	64.70±2.60 [c]	-23.55	-38.95	H.S.
Neck (g)	80.10±2.48 [a]	70.50±2.30 [b]	80.65±3.05 [a]	-0.70	-12.60	S.
Back & ribs (g)	251.60±5.70 [a]	247.90±7.60 [a]	223.30±6.10 [b]	12.67	11.02	H.S.
Breast (g)	220.50±7.10 [a]	209.20±6.20 [a]	170.00±5.27 [b]	29.70	23.05	H.S.
Legs & Thighs (g)	344.80±7.70 [a]	332.50±8.40 [a]	279.80±8.80 [b]	23.20	18.80	H.S.
Wings (g)	126.10±2.50 [a]	125.10±3.20 [a]	99.80±2.60 [b]	26.35	25.35	H.S.
Ready to cook (g)	1026.50±20.60 [a]	985.20±24.35 [a]	853.30±23.10 [b]	20.30	15.45	H.S.
Giblets (g)	72.10±1.60 [a]	67.60±1.80 [a]	54.20±1.75 [b]	33.00	24.70	H.S.
Liver (g)	34.60±0.90 [a]	32.30±0.94 [a]	24.90±0.94 [b]	38.90	29.70	H.S.
Gizzard (g)	29.80±0.77 [a]	27.60±0.89 [a]	22.70±0.86 [b]	31.30	21.60	H.S.
Heart (g)	7.70±0.26 [bc]	7.60±0.25 [ac]	6.60±0.27 [a]	16.70	15.15	S.
Carcass & giblets (g)	1098.60±21.90 [a]	1052.80±25.10 [a]	907.60±23.85 [b]	21.04	16.00	H.S.
Breast meat (g)	168.00±5.98 [a]	160.00±5.82 [a]	125.75±3.96 [b]	33.60	27.25	H.S.
Thigh meat (g)	268.03±6.84 [a]	259.17±7.77 [a]	214.63±5.88	24.90	20.75	H.S.
Head (g)	63.30±2.02	59.00±2.18	58.90±1.88	7.45	0.20	N.S.
Legs (g)	63.80±1.98	59.60±1.97	61.30±1.96	4.08	-2.85	N.S.
Femur length (cm)	8.80±0.11 [a]	8.70±0.10 [a]	9.27±0.15 [b]	-5.05	-6.15	H.S.
Tibia length (cm)	13.30±0.14 [b]	12.73±0.16 [a]	13.67±0.15 [b]	-2.70	-6.90	H.S.
Keel length (cm)	10.30±0.18 [b]	9.70±0.15 [a]	10.63±0.14 [b]	-3.10	-8.75	H.S.

* Means within rows with no common superscripts differ significantly (P<0.05).

H.S.= Highly significant (P<0.01). S =Significant (P<0.05) N.S. = Not significant

Table 4. Means and standard errors (X± S.E.) of carcass measurements (% of live weight) in naked neck (Na/-) and normal feathering (nana) at 16 weeks of age

Variable	Genotypes*			%Na gene Effect		Significance
	Nana (N=30)	NaNa (N=30)	nana (N=30)	Nana	NaNa	
Blood %	4.37±0.09	4.26±0.08	4.49±0.10	0.12	0.23	N.S.
Feather %	3.48±0.12 [b]	2.85±0.08	5.04±0.15	-1.56	-2.19	H.S.
Neck %	5.62±0.14 [b]	5.11±0.13	6.27±0.16	-0.65	-1.16	H.S.
Black & ribs %	17.68±0.28	17.89±0.29	17.43±0.27	0.25	0.46	N.S.
Breast %	15.45±0.29 [a]	15.14±0.28	13.25±0.19	2.20	1.89	H.S.
Legs & Thighs %	24.19±0.24 [a]	24.05±0.25	21.81±0.28	2.38	2.24	H.S.
Wings %	8.93±0.11 [a]	9.06±0.14 [a]	7.80±0.09 [b]	1.13	1.26	H.S.
Ready to cook %	71.87±0.45 [a]	71.25±0.54 [a]	66.55±0.39 [b]	5.32	4.70	H.S.
Giblets %	5.07±0.09 [a]	4.92±0.11 [a]	4.24±0.12 [b]	0.83	0.68	H.S.
Liver %	2.41±0.06 [a]	2.36±0.07 [a]	1.93±0.06 [b]	0.48	0.43	H.S.
Gizzard %	2.12±0.05 [a]	2.10±0.06 [a]	1.79±0.07 [b]	0.42	0.40	H.S.
Heart %	0.54±0.01	0.56±0.01	0.52±0.01	0.02	0.04	N.S.
Dressing %	76.94±0.41 [a]	76.17±0.49 [a]	70.79±0.37 [b]	6.15	5.38	H.S.
Breast meat %	11.79±0.27 [a]	11.59±0.27 [a]	9.80±0.20 [b]	1.99	1.79	H.S.
Thigh meat %	18.81±0.28 [a]	18.76±0.27 [a]	16.72±0.18 [b]	2.09	2.04	H.S.
Head %	4.45±0.10	0.27±0.12	4.59±0.09	-0.14	-0.32	N.S.
Shanks %	4.48±0.09 [a]	4.32±0.09 [a]	4.78±0.09 [b]	-0.30	-0.46	H.S.

* Means within rows with no common superscripts differ significantly (P<0.05).

The presence of Na gene reduced significantly ($P<0.05$) the neck weight (g) whereas the reduction was highly significant ($P<0.01$) as a percentage (%) from live body weight. With respect to back weight, Table (5) showed a highly significant differences ($P<0.01$) between genotypes, but when calculated as a percentage (%), the differences were insignificant although the naked neck birds (Na/-) exhibited values more than the normally feathered birds (nana).

In the present study, the main effect of the Na gene is the reduction of the feather weight by about 24-39% as compared with the normal birds (nana). This may explain the improvement of slaughter yield associated with the naked neck genotypes (Na/-).

Tables (3 and 4) showed an advantage in weights (g) or percentage (%) of breast, legs and thighs, wings, eviscerated carcass and giblets (liver, gizzard and heart) associated with Na gene. Hence, the advantage in term of dressing percentages were clearly demonstrated in the present study. The dressing percentages were about 76.90%, 76.20% and 70.80% in Nana, NaNa and nana genotypes, respectively. The Na gene increased the dressing weight (carcass+giblets) by about 21% and 16% in Nana and NaNa genotypes, respectively.

Table (5) showed highly significant differences ($P<0.01$) between genotypes for weight(g) or percentage(%) of breast, thighs, wings, eviscerated carcass giblets and dressing percentage.

These results are in agreement with the findings of Bordas *et al.* (1978); Monnet *et al.* (1979); Hanzl and Sames (1983); Zein El-Dein (1981); El-Atar and Merat (1985) and Merat (1990). These studies reported that the proportion of eviscertated carcass is superior for Nana genotype compared with nana genotype and the advantage of Na gene may be relatively higher in medium or light-weight populations and possibly also in those given a low protein diet (Zein El-Dein *et al.*, 1984).

The Na gene improved not only the slaughter yield but also the meat yield of breast and thighs. Breast meat (g) of heterozygous (Nana) and homozygous (NaNa) was more than normally feathered (nana) by about 33.60% and 27.30%, respectively. The thighs meat of the Nana and NaNa surpased that nana by about 24.90% and 20.80%, respectively. Highly significant differences ($P<0.01$) attributed to genotypic effect were observed for the weights or percentages of breast and thighs region meat (Table 5).

The data obtained is in agreement with the findings of Zein El-Dein *et al.* (1981); El-Atar and Merat (1985); Fathi (1992); Cahaner *et al.* (1993).

Cahaner *et al.* (1993) found that heterozygous and homozygous broilers (8 weeks) maintained at 32°C produced about 17% and 32% more breast meat than their normally feathered sibs. Similar results were also obtained by El-Atar and Fathi (1995).

On the other hand, Bordas *et al.* (1978) did not detect significant differences attributed to genotype effect in thigh region (thigh + leg).

Table 5. Mean squares values (M.S.) of carcass measurements in naked neck (Na/-) and normal feathering (nana) at 16 weeks of age

Source of variation	d.f	M.S. values						
		Body weight	Blood	Feather	Neck	Back & ribs	Breast	Thighs
Genotype[a]	2	153804**	171.33 N.S	4832.16**	975.64*	7098.70**	21102.80**	35585.40**
Error	87	25156.25	101.69	142.53	208.10	1256.50	1168.30	2090.20
Genotype[b]	2	-	0.365 N.S.	38.15**	10.22**	1.60 N.S.	42.53**	53.47**
Error	87	-	0.244	0.46	0.64	2.31	2.08	1.99

Source of variation	d.f	M.S. values						
		Wings	Ready to cook	Giblets	Dressing	Liver	Gizzard	Heart
Genotype[a]	2	6654.78**	224086.05**	2572.85**	293481.25**	711.30**	398.40**	8.20*
Error	87	233.06	15557.80	89.61	16830.50	26.25	21.46	2.10
Genotype[b]	2	14.51**	253.30**	5.88**	340.92**	1.99**	0.77**	0.02 N.S.
Error	87	0.40	6.55	0.36	5.43	0.12	0.11	0.01

Source of variation	d.f	M.S. values						
		Breast meat	Thighs meat	Head	Shanks	Femur (cm)	Tibia (cm)	Sternum (cm)
Genotype[a]	2	15150.75**	24566.95**	186.35 N.S.	129.95 N.S.	2.98**	6.63**	5.28**
Error	87	838.37	1405.79	123.94	116.02	0.47	0.68	0.78
Genotype[b]	2	35.92**	42.31**	0.78 N.S.	1.64**	-	-	-
Error	87	1.90	1.87	0.34	0.26	-	-	-

a- Absolute values. b- % from live body weight.
* Significant (P<0.05) ** Highly significant (P<0.01).
N.S. Not significant.

The connection between reduced plumage and increased meat yield was clearly demonstrated in this study and was confirmed by the findings of Edriss *et al.* (1988) and Ajang *et al.* (1993) who found that after three selection cycles, the slow feathering line had lower feather and skin weight and higher body weight and breast meat than the fast feathering. The results in the present study for the naked neck birds (Na/-) and normally feathered were similar to those obtained by Ajang *et al.* (1993). Together, these studies support the hypothesis that meat production of chickens can be improved by reducing plumage either via the Na gene or by selection for quantitative loci controlling the rate of feather development.

Several mechanisms appeared to be responsible for higher meat production in chickens reduced plumage. Merat (1986) summarized three of them 1) less feather production, leaving more protein for other tissues mainly muscles (meat), 2) faster dissipation of heat and hence less depression of appetite and consequent growth at high ambient temperatures, and 3) lower fat content due to utilization of a higher proportion of the lipids for thermoregulation.

Also, Cahaner *et al.* (1987) pointed out that due to lower water content in feathers than in muscles, a reduction of 1 g feathers may increase body weight gain 1.5 g.

On the other hand, the naked neck birds (Na/-) exhibited a reduction in head percentage as compared with normally feathered (nana) but the differences between genotypes were insignificant Table (5). Similar reduction was also obtained for the shanks percentage but the differences between genotypes were highly significant ($P<0.01$). This is in agreement with the findings of Zein El-Dien (1981), Zein El-Dien *et al.* (1984) and El-Atar and Merat (1985).

As shown in Table (3), the naked neck gene (Na) reduced the bones length (femur, tibia and keel) as compared with the normally feathered genotype (nana). The differences due to genotypes were highly significant $P<0.01$ (Table 5).

Finally, the present study gave additional performance benefit for the naked neck birds (Na/-) vs the normally feathered genotype (nana) for body weight, growth rate and meat yield especially in small body weight populations.

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تأثير جين الرقبة العارية على النمو ومقاييس الذبيحة فى ذكور الدجاج الشركسى تحت ظروف أسيوط

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استخدم فى البحث ٢٢٥ ذكراً من ثلاثة تراكيب وراثية هى العارى الرقبه الخليط ، العارى الرقبه الاصيل والطبيعى التريش لمعرفة تأثير جين الرقبه العارية على النمو ومقاييس الذبيحة وكانت النتائج المتحصل عليها كما يلى :

١- أظهرت الطيور العارية الرقبة الخليطة أو الأصيلة التركيب الوراثى وزناً أكبر من الطيور الطبيعية التريش عند الفقس أو عند عمر ٤ أسابيع ولكن الفروق بين التراكيب الوراثية كانت غير معنوية .

٢- كان التركيب الوراثى العارى الخليط أكبر وزناً من الطبيعى التريش بحوالى ٤٠ر٩٪ ، ٥٠ر١٥٪، ٧٠ر١٩٪ عند عمر ٨ ، ١٢ ، ١٦ أسبوعاً من العمر على التوالى . وكانت الزيادة فى التركيب الوراثى الأصيل ٤٪ ، ٤٠ر٦٪ ، ٩٠ر٨٪ على نفس الأعمار . وكانت الفروق بين التراكيب الوراثية عالية المعنوية (مستوى ١٪)

٣- تحسن معدل النمو فى الطيور العارية الرقبة بالمقارنة بالطبيعية التريش وبغض النظر عن أن التركيب الوراثى أصيلاً أو خليطاً فان وجود جين الرقبة العارية حسن من معدل النمو بحوالى ٣٪ ، ٨٥ر٣٪ ، ٠٥ر٣٪ فى الفترة ما بين ٤-٨ ، ٨-١٢ ، ١٢-١٦ أسبوعاً من العمر وكانت الفروق عالية المعنوية (مستوى ١٪) بينما كانت الفروق بين التراكيب الوراثية لنفس الصفة من الفقس حتى ٤ أسبوع أو من الفقس حتى ٨ أسبوع غير معنوية .

٤- انخفض وزن الريش (جم) أو نسبته (٪) فى الطيور العارية الرقبة وكانت نسبة الانخفاض فى وزن الريش بالمقارنة بالتركيب الوراثى الطبيعى التريش حوالى ٥٠ر٢٣٪ ، ٣٩٪ لكل من العارى الرقبة الخليط والأصيل على التوالى . وكانت الفروق بين التراكيب الوراثية عالية المعنوية (مستوى ١٪) . كما أثر جين الرقبة العارية أيضا على خفض وزن الرقبة ونسبتها .

٥- أدى وجود هذا الجين الى تحسن وزن ونسبة كل من الصدر والأفخاذ والأجنحة والذبيحة المعدة للطهى والحوائج وكانت نسبة التصافى ٩٠ر٧٦٪ ، ٢٠ر٧٦٪ ، ٨٠ر٧٠٪ فى كل من التركيب الوراثى العارى الرقبة الخليط والأصيل والطبيعى التريش على التوالى وكانت الفروق بين هذه التراكيب الوراثية عالية المعنوية (مستوى ١٪) كما أظهرت الطيور العارية الرقبة تفوقاً فى وزن ونسبة لحم الصدر والأفخاذ بالمقارنة بالطيور الطبيعية التريش وكانت الفروق عالية المعنوية (مستوى ١٪) .

٦- أظهرت الطيور العارية الرقبة انخفاضاً فى نسبة الرأس والسيقان بالمقارنة بالطبيعية التريش كما أظهرت انخفاضاً فى طول بعض العظام مثل عظمة الفخذ - عظمة الدبوس - عظمة القص .

وتعطى لنا الدراسة معلومات اضافية لأهمية جين الرقبة العارية وخاصة فى العشائر التى تتميز بالوزن الصغير للجسم تحت ظروف الرعاية الطبيعية .