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Phenotypic Characristics of the Ashanti Black Pig under intensive rearing.

KEYWORDS: Characterisation, Ashanti Black Pig, visual observation, traits and intensive rearing

Alenyorege, B
Department of Animal Science, Faculty of Agriculture, University for Development Studies P.O. Box TL 1882, Nyankpala, Tamale. Ghana.

Kodjo, A. K. Addah. W
Department of Animal Science, Faculty of Agriculture, University for Development Studies P.O. Box TL 1882, Nyankpala, Tamale. Ghana.

ABSTRACT *This study was carried out in Babile Pig Breeding Station in the Upper West Region of Ghana. A total of 159 Ashanti Black Pigs (65 males and 94 females) were used to characterize their phenotypic traits. Pigs were grouped as weaners or young (2 -3 months), Prime age pigs (6 - 10 months) and adults (12 months and above). Parameters observed were; Hair colour (HC), hair texture (HT), Hair posture (HP), hair density at back (HDB), hair density at tail (HDT), hair density at the sides, (HDS), ear orientation (EO), skin colour (SC), curvature of back (CB), eye colour (EC) and length of eye brows (EB). Frequencies and correlations were used to determine traits that best describe the ABP. From the study, most phenotypic traits of the ABP changed as the pig ages. However, the hair of weaners was generally black, straight postured, soft textured and dense at their back. Weaners also had sparse hair covering at their sides, semi-erect ears, black skin, straight back, and brownish black eye colour. The prime age ABPs had jet black, curly or straight hair. Hair was dense at their backs, but sparse at their sides. Their ears were erect and skins black, Prime age ABPs also exhibited straight or arching backs if males and saddle backs if females; long eye browse and black eyes. Adult ABPs were predominantly jet black in hair colour with curly or straight hair, bristle hair texture, dense hair at their backs. This group had sparse hair at their sides, erect ears, and black skin. Their backs were straight if males and or sagged if female. They had long eye browse and black eyes. Traits including SC, HDB and HDS, remained the same throughout the ABP's live.*

Introduction

There is increasing interest in local breeds in Africa due to their adaptation to the local environment. In this light, the Ashanti Black Pig (called differently in some countries) was selected for development into a pure local breed in Ghana since 1994. Existing populations will play major roles in the maintenance of genetic resource for future improvement at production and genetic level. Selection of animals for breeding by farmers is often based on an evaluation of production and reproduction parameters. The production parameters include birth and weaning weights (Combellas, 1980). While reproductive parameters include age at birth, birth interval and litter size at birth and weaning, Characterisation defines breeds in order to preserve the genetic resource (Birteeb, 2011). Characterisation sets the benchmark for distinguishing among breeds. Morphological variation among breeds is often well defined. Characterisation plays a major role in maintenance of these genetic resources as the basis for future improvement at both the production and the genetic levels. Knowledge of morphological parameters and differences between or among breeds will be helpful for breed conservation as well as evaluation of suitable breeds for production and reproduction. It will facilitate choice by traditional farmers of the breed. This study seeks to determine the qualitative phenotypic characteristics of the ABP through visual observation and manual examination.

MATERIALS AND METHODS

Study Area

The study was carried out on a herd of Ashanti Black Pigs at Babile Pig Breeding Station (a Ministry of Food and Agriculture facility). It is located in the Upper West Region of Ghana within latitude $10^0$30 N, longitude 2^0 and 3^0 W. The vegetation is Guinea Savannah. The station is to improve the Ashanti Black Pig as a local Ghanaian breed and this has been on-going for 20 years now.

Data collection

Data was taken on a herd of 159 Ashanti black pigs (65 males and 94 females). Of these, 69 were weaner pigs (2 - 3 months old), 30 were at finisher age (6 - 10 months old) and 60 were adults12 months and above. Morphological traits of these pigs were studied according to the above age groupings and sex of pig. Traits were visually examined (Table 1). These traits were coded for convenience of use.

Table 1: Details of the Phenotypic traits that were evaluated.

Serial №	Traits	Code	Description
1	Hair color at various stages of growth.	HC	Jet/shiny black or black or ashy black or black with brownish tan.
2	Hair posture on the body.	HP	Curly or straight hair.
3	Hair texture.	HT	Soft or bristle hair.
4	Hair density at back	HDB	Dense or sparse.
5	Hair density at tail.	HDT	Dense or sparse.
6	Hair density at sides (flanks to ribs).	HDS	Dense or sparse.
7	Skin color.	SC	Black or ashy black.
8	Ear orientation	EO	Erect or semi erect or droopy
9	Curvature of back.	CB	Arching or saddle or straight.
10	Eye color.	EC	Black or brownish black.
11	Eye browse.	EB	Long or medium or short hair.

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Pictures showing pigs exhibiting these traits are shown figures 1-17.

These traits are popular in describing breeds of pigs except a few such as length of eye brows. The quality of a characteristic/trait was declared after a majority from a trained panel chose a particular description for the trait after close range observation/examination.

If hair is sparse, the skin beneath can be seen without parting the hair and hair is dense if hair must be parted in order to see the skin. Eye browse longer than 3 cm, are long; 2 to 3 cm are medium and below 2 cm, short. Bristle hair is coarse and felt individually as strands when touched. While soft hair felt in mass.

Erect ears point upwards, while droopy ears point downwards and semi erect points laterally. An arching back curvature has the mid point higher than the shoulder and rump regions, while a saddle back curvature has the mid point lower than the shoulder and rump regions and a straight back virtually has no portion higher than the other.

Stages of growth of pigs being characterised

Pigs were grouped into three main stages of growth for this study. Characteristics often change as the animal grows and matures. Pigs were therefore grouped according to the following: Growers, Finishers and adults. These corresponded to the following age ranges: 2- 3 months, 6-10 months and 12 months and above respectively. The oldest pig in the herd was about 36 months.

Data analysis.

Data was analyzed by descriptive statistics using excel and presented in tables. Least Square of means was used to contrast traits; .while simple correlation was used to compare the traits.

RESULTS

Phenotypic traits of grower Pigs:

Sixty nine (69) grower pigs (2-3 month old) comprising 35 males and 34 females were available for study. Table 2 shows the frequency of occurrence of the various phenotypic traits observed.

Frequency of Traits.

Table 2. Frequency of phenotypic traits evaluated among grower ABPs.

Parameter	Description	Frequency	Percentage
Hair colour	Jet black	6	8.7
	Black	26	37.7
	Ashy black	7	10.1
	Black with brownish tan	30	43.5
	Total	69	100
Hair posture	Curly	8	11.6
	Straight	61	88.4
	Total	69	100
Hair texture	Soft	51	73.9
	Bristles	18	23.1
	Total	69	100
Hair density at Back	Dense	62	89.9
	Sparse	7	10.1
	Total	69	100
Hair density at tail	Dense	39	56.5
	Sparse	30	43.5
	Total	69	100
Hair density at sides	Sparse hair	69	100
	Total	69	100
Ear orientation	Erect	10	14.5
	Semi erect	56	81.2
	Droopy	3	4.3
	Total	69	100
Skin colour	Black	47	68.1
	Ashy black	22	31.9
	Total	69	100
Curvature of bark	Straight	69	100
	Total	69	100
Eye browse	Long	8	11.6
	Medium	50	72.5
	Short	11	15.9
	Total	69	100
Eye colour	Black	31	44.9
	Brownish black	38	55.1
	Total	69	100

All (100%) weaner pigs had sparse hair at their sides and straight backline curvature; while 89.9, 88.4 and 81.2 %, had straight hair posture, dense hair at backline and semi-erect ears respectively.

Influence of sex on traits

Table 5: Phenotypic traits according to Sex of growers

Traits	Descriptions	% of Males	% of Females
Hair colour	Jet black	29.4	45.7
	Black with brownish tan	55.9	31.4
Hair posture:	Straight	85.3	91.4
Hair texture	Soft	70.6	91.4
Hair density at back line	Dense	82.9	97.1
Hair density at tail:	Sparse	80.0	94.1
Hair density at sides	Sparse	100	100
Ear orientation	Semi erect	88.6	73.5
Skin colour:	Black	64.7	74.3
Curvature at back	Straight	100	100
Eye browse	Medium	67.6	71.4
Eye colour:	Brownish black	58.8	60
	Black	41.2	40

The effects of sex on phenotypic traits of grower pigs are presented in Table 5.There are differences in morphology due to sex. Females have higher frequencies in most (eight out of 13) of the descriptive traits than males while having equal frequency in two.

Table 3: Least square means (± S.E) of phenotypic traits of growers according to sex

Dependent Variable	Overall Mean	Males	Females
HC	2.887 ± 0.128	2.686 ± 0.180	3.088 ± 0.183
HP	1.884 ± 0.039	1.857 ± 0.055	1.912 ± 0.056
HT	1.261 ± 0.540	1.229 ± 0.075	1.294 ± 0.076
HDB	1.100 ± 0.036	1.171 ± 0.050	1.029 ± 0.051
HDT	1.429 ± 0.040	1.800 ± 0.056	1.059 ± 0.057
HDS	2.000 ± 0.000	2.000 ± 0.000	2.000 ± 0.000
EO	1.899 ± 0.520	1.886 ± 0.072	1.912 ± 0.073
SC	1.320 ± 0.056	1.257 ± 0.079	1.382 ± 0.080
CBL	3.000 ± 0.000	3.000 ± 0.000	3.000 ± 0.000
EB	2.044 ± 0.064	2.000 ± 0.089	2.088 ± 0.091
EC	1.551 ± 0.061	1.543 ± 0.085	1.559 ± 0.087

The result of the least square means (Table 3) show that several traits: HC, HP, HT, EO, SC, EB and EC exhibited higher dominance in grower females over their male counterparts. The range of dominance was 0.02-0.06 (2 - 6 %).while HDB and HDT exhibited high dominance in males over females. The range of dominance was 0.14-0 to 0.74 (14 - 74 %). CBL and HDS exhibited equal dominance in both sexes.

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Relationship between the various phenotypic Traits Among grower Pigs.

Table 4: Correlation of phenotypic traits of grower ABPs

	HC	HP	HT	HDP	HDT	EO	SC	EB	EC
HC	1.00								
HP	0.088	1.00							
HT	0.095	0.009	1.00						
HDP	-0.0233	0.122	0.019	1.00					
HDT	-0.096	-0.048	-0.122	0.189	1.00				
EO	0.070	-0.020	-0.014	-0.033	0.003	1.00			
EB	0.087	-0.056	-0.176	-0.120	0.207	-0.046	0.062	1.00	
EC	-0.043	0.128	0.138	0.110	0.028	-0.148	-0.070	-0.092	1.00

Correlation is significant at the level 0.01 (2 tailed).

The highest positive correlations was length of eye brows and hair density at tail (0.207), followed by hair texture and eye colour with a correlation of 0.138. On the other hand, there was negative correlation between length of eye brows and hair texture (-0.176) as well as eye colour and ear orientation (-0.148).

Finisher ABPs (6-10 m0nth)

Thirty of these were available for observation. (12 males and 18 females).

Table 6. Frequency of phenotypic traits evaluated among finisher ABPs.

Dependent variable	Descriptions	Frequency	Percent
Hair colour	Jet black	26	86.7
	Black with brownish tan	4	13.3
	Total	30	100
Hair posture	Curly	14	46.7
	Straight	16	53.3
	Total	30	100
Hair texture	Bristles	30	100
	Total	30	100
Hair density at back	Dense	30	100
	Total	30	100
Hair density at tail	Dense	22	73.3
	Sparse	8	26.7
	Total	30	100
Hair density at sides	Sparse	30	100
	Total	30	100
Ear orientation	Erect	10	33.3
	Semi erect	20	67.7
	Total	30	100
Skin colour	Black	30	100
	Total	30	100
Curvature of backline	Arching	30	100
	Total	30	100
Eye browse	Long	29	96.7
	Medium	1	3.3
	Total	30	100
Eye colour	Black	27	80.1
	Brownish black	3	9.9
	Total	30	100

All (100%) finishers under observation had bristle hair, dense hair at the backline, sparse hair density at their sides, black skin clour and arching back.

Table 7: Phenotypic correlation of body traits of Finisher ABP Pigs

Trait	HC	HP	HDT	EO	EB	EC
HC	1.00					
HP	0.170	1.00				
HDT	-0.015	-0.048	1.00			
EO	-0.125	-0.085	-0.048	1.00		
EB	-0.073	0.174	0.308	-0.059	1.00	
EC	0.196	0.089	0.050	-0.106	-0.062	1.00

Correlation is significant at the level 0.01 (2tailed)

The result of the least square means (Table 8) shows that: HC and HDT exhibited more dominance in males than in females..While EO and EC dominated more in females than in males. HDS and HDB, HT, SC and CB exhibited equal dominance in both males and females.

Table 8: Least square mean (± S.E) of phenotypic traits of finishers according to sex.

Dependent Variable	Overall mean	Male	Female
HC	1.417±0.196	1.500±0.304	1.333±0.0248
HP	1.542±0.096	1.583±0.148	1.500±0.121
HT	1.000±0.000	1.000±0.000	1.000±0.000
HDB	1.000±0.000	1.000±0.000	1.000±0.000
HDT	1.292±0.082	1.417±0.127	1.167±0.104
HDS	2.000±0.000	2.000±0.000	2.000±0.000
EO	1.139±0.93	1.000±0.159	1.278±0.123
SC	1.000±0.000	1.000±0.000	1.000±0.000
CB	1.000±0.000	1.000±0.000	1.000±0.000
EB	1.042±0.034	1.083±0.052	1.000±0.043
EC	1.125±0.053	1.250±0.082	1.000±0.067

The result of the least square means in the table 14 above confirm that males were more jet black, shows that HC, HP, HDT and EB showed higher least square means in 6-10 month old males over their female counterparts. It is in the range of 0.08-0.25 (8 and 25 %). However, frequency in EO is higher in females t than in males. HT, SC, CBL and HDBL exhibited equal least square means in both the males and females. Also HDS exhibited equal least square means in both males and in females.

Adults, 12 months and above.

These were 60 in number and comprised of 18 males and 42 females

Table 10. Frequency of Phenotypic traits in Adults ABPs according sex.

Parameter/Traits	Descriptions	Frequency	Percentage
HC	Jet/shiny black	45	75
	Black	1	1.7
	Black with brownish tan	14	23.3
	Total	60	100.0
HP	Curly	32	53.3
	Straight	28	46.7
	Total	60	100.0
HT	Soft	6	10
	Bristle	54	90
	Total	60	100.0
HBL	Highly dense	60	100.0
HDT	Dense	54	90
	Sparse	6	10
	Total	60	100.0
HDS	Sparse hair	60	100.0

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EO	Erect	55	91.7
	Semi erect	1	1.7
	Droopy	4	6.7
	Total	60	100
SC	Black	55	91.7
	Ashy black	5	8.3
	Total	60	100.0
CBL	Saddle	31	51.7
	Arching	13	21.7
	Straight	16	21.6
	Total	60	100.0
EB	Long	52	86.7
	Medium	8	13.3
	Total	60	100.0
EC	Black	52	86.7
	Brownish black	8	13.2
	Total	60	100.0

Table 11: Phenotypic traits of adults according to Sex

Parameter/ Traits	Descriptions	Males	Females
HC	Jet/shiny black	72.2	0
	Dull black	0	100
	Ashy black	5.6	0
	Dark with brownish ends	22.2	0
HP	Curly	22.2	66.7
	Straight	77.8	33.3
HT	Soft	0	14.3
	Bristle	100	85.7
HBL	Highly dense	100	100
HDT	Dense	100	100
HDS	Sparse hair	100	100
EO	Erect	72.2	100
	Semi erect	5.6	0
	Droopy	22.2	0
SC	Black	100	88.1
	Ashy black	0	11.9
CBL	Saddle	23.8	70
	Arching	72.2	49
	Straight	0	23
EB	Long	83.3	85.7
	Medium	16.7	14.3
EC	Black	88.9	85.7
	Brownish black	11.1	14.3

Table 11. Least square mean (± s.e) of phenotypic traits of Adult ABPs according to sex.

Dependant Variable	Overall Mean	Male	Female
HC	1.746±0.183	1.778±0.306	1.714±0.200
HP	1.556±0.065	1.778±0.109	1.333±0.071
HT	1.929±0.042	2.000±0.070	1.857±0.046
HBL	1.000±0.000	1.000±0.000	1.000±0.000
HDT	1.087±0.043	1.056±0.072	1.119±0.047
HDS	2.000±0.000	2.000±0.000	2.000±0.000
EO	1.250±0.065	1.500±0.109	1.000±0.072
SC	1.060±0.039	1.000±0.065	1.119±0.043
CBL	1.774±-0.121	1.833±0.203	1.714±0.133
EB	1.143±0.049	1.167±0.081	1.119±0.053
EC	1.127±0.049	1.111±0.081	1.143±0.053

The least square means in the table 11 above shows that:

HC, HP, HT, EO and CBL exhibited dominance in the males fatteners over the females. While HBL, SC and EC females exhibited dominance over the males. HDSW exhibited equal dominance in both males and females. Also HDT did the same.

Table 12. Phenotypic correlation of body traits of adult ABPs

	HC	HP	HT	HDT	EO	CBL	EB	EC
HC	1.00							
HP	-0.014	1.00						
HT	0.061	0.089	1.00					
HDT	0.461**	-0.089	-0.074	1.00				
E O	0.087	0.182	0.098	-0.098	1.00			
CBL	0.77	0.157	0.033	0.98	0.163	1.00		
EB	0.005	0.124	0.131	-0.131	-0.115	-0.O58	1.00	
EC	0.005	-0.072	0.033	0.33	-0.115	0.000	0.135	1.00

Correlation is significant at the level 0.01 (2 tailed).

Table 13. Frequencies (in %) of external traits that best describe the ABP at key stages of growth.

Trait	Growers	Finishers	Adults
Jet black hair	-	86.7	75
Straight hair	88.4	-	-
Soft hair	73.8	-	-
Bristle hair	0	100	90
Highly dense back hair	89.9	100	-
Dense tail hair	-	-	100
Sparse side hair	100	100	100
Erect ears	-	-	91.7
Semi erect ears	81.2	-	-
Black skin	-	100	91.7
Saddle back	-	100	-
Straight back	100	-	-
Long eye brows	-	96.7	86.7
Black eyes	-	80.1	86.7

DISCUSSION

Intensity of the blackness of hair among ABPs increased with age till about 10 months. At 2-3 months old, 43.6 % of them were black with brownish tan while only 8.7 % were jet black in colour. By 6 - 10 months old, frequency of the jet black colour increased to 86.7 %. This frequency slightly declined to 75 %.at adult age of 12 months and above. (Gopalakrishan and Lal, 1996; Serres.,(1992) gave the characteristics of ABP as black skin occasionally spotted, variable coat consisting of long and thick hairs It is not clear whether sex hormones that proliferate as animals sexually mature, have a role in the expression of colour in the ABP.

At weaner age, most (88.4 %) ABPs had straight hair posture. According to Denton (1986), a round or circular hair shaft makes the hair less kinky thus, resulting more in straight hair posture. This posture allows more penetration of air to the skin thus exposing such pigs to chilling during cold temperatures and less heat stress during high temperatures. As weaners grew older, the hair got more kinky or curly. At prime and adult ages, the number of ABPs with straight hair posture reduced to 53.3 and 46.7 % respectively; thus curly hair dominated among adult pigs. More males tended to have curly hair as ABPs aged. Showing 5.4 and 44.5 % higher in curly hair than females at prime and adult ages respectively It is not clear whether some selection that happened to favour pigs with curly hair was done as the farm regularly selected breeding stock from growing animals. The farm was unable to confirm this since they have not been consciously observing this trend. Most (75.9 %) weaner pigs had soft hair texture. However, the frequency of bristle hair rose to 90 % by adult age with only 10 % having soft hair. Jerry, (2004).stated that high keratin in hair or in the environment will cause the hair to be bristle-like.

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About 89.9 % of the weaners had dense hair at their back. At prime and adult ages, all pigs had dense back hair. However, hair remained sparse at their sides at the various ages. Pigs have the tendency to rub their body against pen walls when something uncomfortable is on or in their skin. However, there was no evidence of this in all the pens. Sparse hair at their sides may therefore be one clear characteristic of these ABPs. About 56.5 % of weaner pigs had dense tail hair, this increased to (73.3 %) at prime age and finally 90 % at adult age. Pigs may effectively drive off insects with a dense or bushy tail especially in a warm and humid environment like Ghana.

At 2-3 months, majority (81.2 %) of ABPs had semi erect ears; while 14.5 % had erect ears. By age 6 – 10 months, 67, 7 % of the pigs had semi erect. While 33.3% had erect ears. At 12 months and above, the increasing trend of erect ears was obvious where only 1.7 % of these pigs had semi erect ears and 91.7 % had erect ears. (Gopalakrishan and Lal, 1996;.Serres.,(1992) gave the characteristics of ABP as small ears which are either horizontal or slightly pricked, lanky body which carries fairly long legs sloped hind quarters and harms are not full, larger hind quarters in males, Large ears have the tendency to droop due to weight while medium sized ears are semi-erect. Erect ears suggest that the ABP has small size ears. Small ears are acquired when conservation of glycine is high in the body. (Denton, 1986). Erect ears help the ABP to see broadly when feeding or during scavenging in the bush for food. These pigs can also detect enemies easily as their view is not blocked by their ears. Denton, (1986) also stated that Glutamic acid occurrence in alleles increases ear size. This may not have occurred in the pigs.

Black skin colour dominated in these pigs at all ages; implying that the ABP's skin is black pigmented. Only 31.9 and 8.3 % had ashy black skin at 2-3 and at 12 months and above respectively. This could be due to high melanin production by their body system giving the skin its black colour as revealed by (Saferstein, 2002). Black pigmented skin is useful. Black skin offers the pigs higher chance to dissipate or absorb heat better (Wong and Simmon, 2001). This attribute of the black skin minimizes sunburns in the ABP in the sunny Ghanaian environment.

All 2-3 month pigs had straight back lines. At ages 6 - 10 and 12 months plus, 100 and 51.7 % had arching and saddle backs respectively. Straight backs were, 21.7 and 21.6 % in 6-10 and 12 months plus pigs respectively. The increase in frequency of saddle back at 12 months plus may be related to reproductive functions of the pig at this stage. Ahunu *et al* (1995) described the ABP sow as having an abdomen that almost touches the ground when heavily gravid. This feature may not be genetic, but rather the relatively short height of the breed. Saddle backs are observed in other breeds under gestation as such, it may not be used in characterising the ABP.

The eyebrows of 72.5 % of the 2-3 month pigs were medium (2-3 cm) in length. By 6-10 months old, 96.7 % of pigs had long eye brows (above 3 cm in length). At 12 months and over, most (86.7 %) of the pigs had medium length eye brows. The rest (13. 3 %) were medium. Hair can wear off with age and reduce in length probably accounting for the reduction in long eyebrows at age 12 months and above. This length of eyebrows offers a high advantage for protecting their eyes against entry of foreign materials including insects especially under free range rearing.The ABP had brownish black eyes at 2-3 months old. The eyes got black in colour with 80.1 and 86.7 % of them showing black eye colour at 6-10 and 12 months plus respectively..

CONCLUSION AND RECOMMENDATIONS

Phenotypic traits exhibited by young ABPs changed with age. Several phenotypic traits contribute in the description of this pig under intensive rearing. However, the most crucial ones are its sparce hair at the sides, bristle and black hair, long eye brows, black skin and eyes,

Precision can be enhanced if these phenotypic traits were tracked in a set of a larger ABP herd from their birth to adult age.

Acknowledegement

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Figures showing some Phenotypic Traits of the Ashanti Black Pigs in This Study.

Figure 1. ABP with Straight hair

Figure 2. ABP with Curley hair

Figure 3. Bristle and Black hair with Brownish tan of the ABP

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Figure 4. Soft hair of ABP.

Figure 5. ABP with Straight back

Figure 6. Arching back of a 6-10 month ABP

Figure 7. Arching back of a dry (non pregnant) ABP Sow

Figure 8. Saddle back of pregnant ABP Sow.

REFERENCE

Ahaunu B.K.; Boa-Amponsem.K; Okantah. S.A; Aboagye.G.S.; and Boadu. M.K.(1995). National Animal Breeding Plans for the Republic of Ghana. March 1995. Technicaal Report.p 51-66. Birteeb, P.T. (2011). Discriminate Analysis and Weight Estimation of Sheep Breeds in Northern Ghana.MSc thesis, University for Development Studies, Pp. 3-4. Combellas, J. (1980). Production and Reproduction Parameters of Tropical Breeds in Improve Production System. Tropical Animal Production 5 (3): 266-272. *Darwin, C. (1871). The decent of man, and selection in relation to sex. John Murray, London. Denton, M. (1986). Evolution: A theory in crisis. Adler and Adler, New York.Pp.106. Epstein, H. (1971). The Origin of Domestic Animals of Africa. (volume 2). New York: Africana Publishing. Gopalakrishan, C.A. and Lal, G.M.M. (1996).Livestock and Poultry Enterprise for Rural Development.Vikas Publishing House.PVL Ltd. 576, Masjid Road, Jangpara, New Delhi-110041.Pp.755850. Jerry, B. (2004)., Northwwest State College 22-600 state Rt 34, Archbold, OH 43543.Recieved April 4, 2003; Revised October 13, 2003. 40 volume, March 2004. Saferstein and Richard, (2002).Criminalistics: An introduction to forensic science. Prentice. Hall Upper Saddle River, N.J. Pp.205. Serres, H. (1992). Manual of Pig Production in the Tropics.Published by C.A.B. International Wallingford, U. K. Pp: ix-136. Wong. K and Simmons. N. (2001). What is the difference between hair and fur. Scientific American Feb. 20. online www. sciam. Com /askexpert / biology /biology 45.