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CHARACTERIZATION OF THE LOCAL PIGEON IN SOUTH WESTERN NIGERIA

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Target Audience: Animal scientists and household microlivestock rearers.

ABSTRACT

A study, covering two years and eight states, was carried out on local pigeons kept semi-intensively with the aim of characterising them. Quantitative traits measured were shank length, backbone length, wing length, beak length, live weight, breast girth, breast length, bird height, annual egg number and eggs hatched per pigeon. These traits were analysed with respect to sex, feather colour, shank colour and shank feathering. Male and female birds as well as those with smooth and feathered shanks made up 52% and 48% of the total number respectively. Birds with black, white, grey and mottled feather colour were 19%, 28%, 16% and 33% respectively while those with black, red and grey shanks were 15%, 78% and 7% of the population respectively. The results of the analyses showed that sex differences were significant ($P<0.05$) for shank length only, with male having longer shanks (3.92 ± 0.61 cm vs 3.74± 0.56 cm) Feather colour and shank colour, on the other hand, significantly affected most traits ($P<0.001$). The interaction between shank colour and shank feathering was significant for beak length and breast girth ($P<0.001$) and for bird height ($P<0.05$). Birds with grey and feathered shanks had biggest breast girth (21.26cm) while those with red and feathered shanks had smallest breast girth (15.50 cm) The correlation coefficients among these traits were mostly low to medium and negative (0.002 for bird height and backbone length, to 0.49 for breast girth and live weight). Only that for eggs laid and eggs hatched was very high, (0.99), as expected. These results indicated that the traits are likely to be independent. However, feather and shank colours could be used to characterise the birds.

Key words: Pigeons, qualitative trait, characterisation.

DESCRIPTION OF PROBLEM

Pigeon (*Columbia livia)* is classified as poultry along with other domesticated birds which include chicken (fowl), duck, geese, turkey, pheasant, guinea fowl and peacock. In other countries of the world, pigeons are usually kept as show birds, for sport - as racing birds, and as means of communication due to their homing instinct (1). They are also widely used as experimental models and have been raised, for long time, as meat animals. A squab (young pigeon) production industry had existed in North America since the early 1960s and the annual production is over a million squab in the United States (2).

In Nigeria, pigeons exist essentially as game and pet birds sharing habitation with man and yet untamed. They are mostly kept by fetish minded people and priests and eaten for ritualistic purposes, hence of no practical significance (3,4). Oluyemi (3), however, called for investigation into their production (as with quails) under tropical conditions as the mastery of their production technology under local conditions can contribute significantly to poultry consumption and commercialization.

The aim of this work, therefore, was to first characterize Nigeria indigenous pigeon using those available in the South Western Nigeria since most conformation traits important for cataloguing pigeon breeds are quantitative (5)

MATERIALS AND METHODS

Birds used were those kept by local farmers at different locations in Lagos, Ogun, Oyo, Oshun, Ondo, Edo, Delta and Kwara States of Nigeria. They were raised semi-intensively in that they were free to fly out during the day after being fed in the morning and come back into the shelter provided anytime but particularly at night to be fed again. Housing materials included partitioned boxes for roosting and laying. They were fed mostly with millet but also broken maize, maize offal and kitchen wastes supplemented with other materials (including insects, leaves etc.) as they ranged during the day.

The quantitative traits measured included shank length (cm), wing length (cm), beak length (cm), live weight (kg), breast girth (cm), breast length (cm) and bird height (cm). Number of eggs laid and hatched per bird per year were also recorded and hatchability calculated. Analyses of data were carried out using the least-squares maximum likelihood programme (6), with sex, feather colour, shank colour, shank feather and beak colour as dependable variables (qualitative traits)

RESULTS AND DISCUSSION

Table 1 shows the mean squares for the quantitative traits against the qualitative ones. From the Table, sexual dimorphism was found to be significant ($P<0.05$) for shank length only. Average shank length for males was 3.92cm as against 3.74 cm for females.

Feather colour affected all traits studied except backbone length, beak length and live weight. The level of significance was very high ($P<0.001$) except for breast girth ($P<0.05$). From Table 2, mottled feathered pigeons had the highest values for live weight (0.48kg), beak length (1.73cm) and bird height (51.95 cm) yet lowest values for shank length (3.65cm), backbone length (13.21cm) and wing length (18.35). The negative correlation between shank length and bird height (-0.24, Table 3) is indicative of the fact that tall birds do not necessarily have long shanks. However, considering the live weight (0.48g) with the breast girth (18.55 cm) in relation to the value of the positive correlation between them (0.49, Table 3), one could infer that mottled feathered pigeons are likely to be good for meat production. Grey feathered pigeons

Table 1: Mean squares and degrees of freedom for the different traits

Sources	Df	Shank length	Bone length	Wing length	Beak length	Live weight	Breast girth	Breast length	Bird height	egg no.	eggs hatched
Sex	1	1.11*	23.46	52.11	0.003	0.27	2.73	9.79	156.70	—	—
Feather colour	3	1.71***	118.13	2763.34***	0.90	0.16	54.87*	256.82***	5733.50***	165.96***	165.57***
Shank colour	2	0.81*	32.71	1916.70*	9.01***	0.34*	52.47	364.73***	74.43	15.37	23.39
Shank feather	1	0.80	233.17	148.44	1.61	0.03	30.59	2.24	631.38	24.69	27.63
Beak colour	3	2.46***	760.78***	840.51	0.42	0.51***	196.06***	—	6264.50***	106.43***	83.26**
Shank colour X Shank feather	2	0.58	178.27*	21.36	2.86	0.11	172.64*	118.12	3490.65*	0.64	0.32

*P P<0.05 **P<0.01 ***P<0.001

had the highest value for breast girth (19.01cm) and the highest hatchability (100%), though not the best layer (11.52 vs 12.08). They also had the highest value for shank length (3.93 cm) and second highest for wing length (24.06cm vs 31.59 cm) which seems to be indicative of a good brooding ability hence the 100% hatchability. This, therefore, shows that grey feathered birds will be good for egg and squab production. The potential was also found in the white feathered pigeons with the highest egg number (12.08), eggs hatched (11.63), good hatchability (96.27%), and body weight (0.39kg) and so could be used for egg production.

Shank colour was significant for shank length, wing length, live weight, beak length and breast length (Table 1). Birds with grey shanks had the highest values for almost all traits studied. Beak colour was significant for shank length, backbone length, live weight, bird height, egg number and eggs hatched. Grey beaked pigeons had the highest egg number and eggs hatched (11.98 and 11.62) followed by white beaked ones (11.66 and 10.75). Hatchability was 96.99% as compared to 99.47% for spotted; 98.54% for black and 92.20% for white. They also had the highest values for shank length (4.04cm) and wing length (27.23cm). On the other hand, black beaked pigeons had the highest live weight (0.48kg) but low egg number (8.89). This is expected since body weight is usually negatively correlated with egg number (Table 3). Coupled with the relatively high hatchability (98.54%), these birds can also be used in selection for meat squab production.

From the colour variations so far, grey colour seems to be most important relative to other colours especially for egg and squab production or breeding purposes. Shanks and beak colours seem to be more related than with feather colour since, as in fowl, they are connected with skin colour (7). According to the report (7), all skin colours known in domestic fowl (including yellow, yellowish white, pinkish white, black, blue, slate and green) arise from the presence, either singly or in combination, of melanin and xanthophyll with pinkish white colour lacking both pigments. It further stated that bright red colour in the shank of fowls, particularly noticeable in males, is caused by the blood in the vessels of the dermis and is responsible for the pinkish cast in the feet of birds that lack yellow or black pigments in the skin. Since no yellow colour was observed in this study, it can be deduced that melanin is responsible for the colour variations (black and grey) observed, while white indicated lack of melanin with red shanks showing blood cast instead of white.

White skin colour was reported to be dominant to yellow and is autosomal (7). In the present study, red colour in the shank (blood blocking white) appears to be dominant to black and grey from the frequencies of occurrence (0.78 vs 0.15 and 0.07 for Red/White, black and grey respectively). The same is not the case for beak colour which is also an indication of skin colour. Here black seems to be dominant.

Table 2: Least-square means and standard errors of the quantitative traits measured

Variables	Subclass	Freq	SHL	BBL	WL	BKL	BH	LW	BG	BL	EN	EH	%HB
Overall Mean ± SE			3.83 0.04	14.70 1.09	23.68 1.98	1.57 0.08	30.43 4.52	0.42 0.03	17.99 0.43	16.22 0.80	9.99 0.71	9.73 0.74	— —
Sex	Male	0.52	3.92^a	14.28	23.05	1.56	28.81	0.48	18.15	15.90	—	—	—
	Female	0.48	3.74^b	15.13	24.31	1.58	32.05	0.37	17.83	16.55	—	—	—
Mean ± SE			0.06	1.53	2.76	0.10	6.28	0.05	0.60	1.10	—	—	—
Feather Colour	Black	0.19	3.82^b	15.06^a	31.59^a	1.45	20.72^b	0.04	17.30^b	15.35^b	7.59^b	7.23	95.26
	White	0.28	3.91^c	15.42	20.70^b	1.55	29.63^a	0.39	17.11^b	15.25^b	12.08^a	11.63	96.27
	Grey	0.16	3.93^c	15.12	24.06^b	1.55	19.14^b	0.39	19.10^a	15.48^b	11.52^a	11.52	100.00
	Mottled	0.37	3.65^a	13.21	18.38^c	1.73	31.95^a	0.48	18.55^a	18.77^a	8.77^b	8.52	97.15
Mean ± SE			0.06	1.59	2.92	0.12	7.61	0.05	0.66	1.12	1.04	1.14	—
Shank Colour	Black	0.15	3.86^a	13.69	16.85^c	1.36^b	28.80	0.46^a	18.19	17.26^a	9.42	9.16	97.24
	Red	0.78	3.71^b	14.84	21.60^b	2.04^a	29.37	0.33^b	16.91	13.22^b	9.28	8.78	94.61
	Grey	0.07	3.92^a	15.59	32.60^a	1.32^b	33.11	0.48^a	18.87	18.21^a	11.27	11.23	99.65
Man ± SE			0.07	1.07	3.14	0.12	7.83	0.04	0.07	1.25	0.80	0.84	—
Shank Feathering	Smooth	0.52	3.91	13.35	24.76	1.44	33.78	0.44	18.53	16.06	10.69	10.47	97.94
	Fethered	0.48	3.76	16.06	22.60	1.70	27.08	0.40	17.45	16.38	9.29	8.99	96.77
Mean ± SE			0.05	1.53	2.97	0.11	6.37	0.04	0.62	1.25	0.80	0.84	—
Beak Colour	Black	0.54	3.68	14.06^b	21.74	1.55^a	45.73^a	0.48	18.67^b	—	8.89^b	8.76^b	98.54
	White	0.20	3.82	20.01^a	26.17	1.59^a	12.23^c	0.46	15.77^c	—	11.66^a	10.75^a	92.20
	Grey	0.22	4.04	13.28^b	27.23	1.51^a	13.32^c	0.30	17.16^b	—	11.98^a	11.62^a	96.99
	Spotted	0.44	3.63	14.31^b	17.45	1.19^b	35.98^b	0.35	22.29^a	—	7.52^b	7.48^b	99.47
Mean ± SE			0.07	1.95	3.59	0.15	7.55	0.05	0.78	—	1.24	1.06	—

SHL = Shank length (cm); BBL = Backbone length (cm); WL = Wing length (cm); BKL = Beak length 9cm); LW = Live-weight (kg); BG = Breast girth length (c); EN = Number of Eggs laid; NH = Number of eggs hatched; % HB = Percentage Hatchability.

TABLE 3. Simple correlations coefficients among traits studied

	Shank length	Bone length	Wing length	Beak length	Live Weight	Breast girth	Breast length	Bird height	Egg No	Eggs hatched
Shank length	1.00									
Bone length	-0.22	1.00								
Wing length	0.04	0.35	1.00							
Beak length	-0.03	-0.15	-0.04	1.00						
Live Weight	-0.09	0.10	-0.16	-0.31	1.00					
Breast girth	-0.34	0.09	-0.44	-0.02	0.49	1.00				
Breast length	-0.33	0.12	0.15	0.06	-0.20	0.32	1.00			
Bird height	-0.24	0.002	-0.11	-0.16	0.44	0.44	0.07	1.00		
Egg Number	0.18	-0.01	-0.20	-0.06	0.16	-0.32	0.32	-0.10	1.00	
Egg hatched	0.18	0.01	-0.18	0.05	-0.14	-.032	-0.33	-0.09	0.99	1.00

The variation in feather colour could be related to that of the skin colour which, according to the report for fowl (7), is determined by the genetic constitution of the cell (epidermal layer) which gives rise to the feather. Though this is modified, in some cases, by the endocrine secretions to which the developing feather is exposed.

Effects of shank feathering (ptilopody) were not significant on any of the traits studied. However, it could be deduced from the observed ratio (0.52 and 0.48) that smooth shank is codominant with feathered shank. This seems to be obvious than that of fowls where genotypes cannot be determined from phenotype because the extent and degree of feathering vary greatly (7). Usir.g crosses among breeds of fowls with sparsely feathered shanks, heavily feathered shanks and non feathered shanks, Somes (8) showed that there may be more than one locus for ptilopody depending on the breeds.

Though shank feathering was not significant for any trait, its interaction with shank colour was. Pigeons with red and smooth shanks had exceptionally long beaks (Table 4). They also had the lowest values for breast girth and

bird height. This is an indication that this type of birds may not be good for breeding or commercial/economic purposes. No other interactions were significant hence their means were removed from Table 1.

The production performances of the birds used in this work compared favourably with reports on exotic pigeons. It had been reported that a pigeon lays 1 - 2 eggs /clutch and 17 eggs/year with 100% hatchability (2, 9, 10 , 11). 4 - week body weight for male King and Texan pigeons (two of the best meat squab breeds) were 595g vs 530g and 550 vs 584g respectively (1, 12).

Table 4. Least-square interaction means and standard error for traits affected.

Shank colour X shank feather	Beak length	Breast girth	Bird height
Black smooth	1.05+0.14	18.82+0.79	36.77+7.46
Black feathered Red smooth	1.67+0.23	17.57+1.23	20.83+13.46
Red feathered	2.15+0.09	15.50+0.43	19.72+6.68
Grey smooth	1.92+0.08	18.32+0.45	39.02+5.97
Grey feathered	1.12+0.27	21.26+1.61	44.84+14.69
	1.51+0.22	16.48+1.26	21.38+14.35

CONCLUSION AND APPLICATION

The results of this work shows that colour variation, especially shank and beak colour, can be used in conjuction with quantitative traits to characterize pigeons into egg and meat types. Grey coloured birds are particularly important and should be included for breeding works.

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