**Application:** Statistical sexual discrimination using bird morphometrics and meristic measures without expending huge resources associated with conventional sexing of quail birds.

**Introduction:** Quail birds are mostly kept for their eggs, which is dependent on the flock size and proportion of female birds within the flock. Many bird species are morphologically monomorphic and are only sexually dimorphic in adult stages, which makes it difficult to determine their sexes accurately at younger ages.

Discrimination of sex in poultry is done using different methods such as examining of feet, neck, feather colour and length as well as cloaca control, radiographic examination, footprint and hormonal or operational method.

Morphometrics is a concept that encompasses both the size and shape of an organism and phenotypic characterization precedes all other forms of characterization, upon which genetic and molecular characterization is built (Ali et al., 2021). Important body morphometrics in quails are body weight (BW), body length (BL), shank length (SL), body girth (BG), and wing length (WL) (Botwe et al., 2023).

Vent sexing or venting is the most used traditional method of determining sex in day-old birds, along with sexing from the primary and secondary wing feathers, whereby qualified and trained professionals can distinguish differences in males and females, by visual examination of the cloaca of the animal. However, this method is both complex and requires huge investment in time, training, and economic resources. Thus, it becomes imperative that some other cost efficient and reliable methods of sex identification and discrimination be developed to achieve that purpose. This study aims to develop a novel approach to sexual discrimination by evaluating differences in morphometric measure and using statistics to build a discriminant function along the sexual divide.

**Materials and Methods:** This study was conducted at the Poultry Unit of the Livestock Farm, Lagos State University, Epe Campus, Lagos Nigeria at latitude 6.586892N and longitude 3.997527E.

A total of 150 quail birds were reared intensively in 15 cages comprising eight female and two male birds, from hatch to sexual maturity, and eggs were collected at 15-18 weeks old, which were set and hatched in the incubator. The birds were assigned unique ID from hatch, and the morphometrics recorded against their IDs. These measurements were used as training data to build a discriminant function along sex lines. Morphometric measures and meristic of the new hatchlings numbering 106 were collected as test data and the data was subjected to linear and quadratic discriminant functions established with the training data.

A digital weighing scale sensitive to 0.00g was used to weigh the Body Weight (BWT), while Body Length (BLT), Wing Length (WLT), Shank Length (SLT), Chest Length (CLT) and Leg Length (LLT) were measured with a flexible measuring tape (mm), while Number of Secondary Feathers (NSF) and Number of Scales on a leg (NSL) were counts. All measurements and counts were used as predictors for the discrimination.

Recorded morphometric and meristic measures were entered on a Microsoft Excel Spreadsheet and analysed using the Minitab® Statistical Software. Statistical analyses included descriptive statistics, t-test for independent samples, linear and quadratic discriminant functions and reclassification based on sex.

**Results:** Only two [Body weight (BWT) and Leg length (LLT)] of the eight variables investigated were statistically different (P<0.05) due to sex, while sex was not significant (P>0.05) on the other six variables studied. The largest difference due to sex was observed in the mean values for body weight where the female birds were 14.7% heavier than male birds (Figure 1). The female birds consistently had higher values than male birds in all variables studied.

Out of the 106 birds tested on the linear discriminant function, the overall accuracy was 68.9% with 73 birds accurately classified to their true groups. This comprised of 34 out of 51female accounting for 66.7% accuracy and 39 out of 55 male birds representing 70.9% accurately classified.

The quadratic discriminant function had a better accuracy with an overall accuracy of 72.6%, while there was improved accuracy for both female (70.6%) and male (74.5%) birds classification based on the morphometric and meristic measures.

**Conclusions:** Morphometric and meristic measures are veritable discriminatory variables that can be used for sex-based discrimination of quail birds without incurring additional expenses for experts and specialists that engage in traditional vent inspection for sexing.

Male birds had lower misclassification values compared to female birds and the quadratic discriminant function provide a more accurate classification when compared to the linear discriminant function.

Shank length (SLT) had the greatest impact on the discriminant function for groups, while body weight and body length had the least in classifying sexes. The discriminant function provides a reliable platform for classification of quail chicks at earlier stages, thereby providing a cost-effective method compared to conventional methods of sexing.

**References**

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