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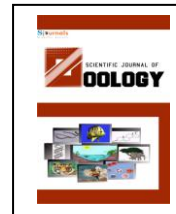Scientific Journals

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Original article

Study of Body Measurements and Slaughter Characteristics in Japanese quail as Influenced by Age

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ABSTRACT

The study was conducted at Avian Research and Training Centre, UVAS Lahore, Pakistan in order to quantify changes in body measurements and slaughter characteristics as a response to aging (3rd, 4th and 5th week) respectively. For this purpose seventy two birds were slaughtered each week. The analysis of data through one way ANOVA in Completely Randomized Design (CRD) and the comparison of means using Least Significant Difference (LSD) test, with the help of SAS 9.1 showed significant increase in body, keel, drum stick, shank and length of intestine as well as drumstick and shank circumference with the advancement in age. Heart and intestinal weight percentage to that of the live weight also increased with the age showing the highest values for 5th week and the lowest for 3rd week while liver, gizzard and giblets weight percentage decreased significantly.

1. Introduction

Japanese quail is the smallest avian specie which can be easily handled, and largely farmed for egg and meat production (Minvielle *et al.*, 1998). Raising quails for meat production is a genuine alternative to other animals raised as sources of animal protein (Faitarone *et al.,* 2005). The quality of poultry meat may be affected by numerous factors associated with either the animal or its environment, such as age, sex, breed, species, rearing and feeding system, handling and slaughtering conditions (Berri *et al*., 2004).

The weight of all the body parts, i.e. giblets, inedible parts and offals, increases with an increasing body weight of bird (Czaja and Gornowicz, 2004). The analysis of body dimensions in poultry bird at different ages shows that their body, keel, drum stick and shank length increased with age (Kozaczyński *et al*., 1999). With the advancement in age, there were significant increases of chest circumference in males and females, sternum length in males and keel length in females (Kozaczyński *et al*., 1999). Significant differences were observed between 6th and 20th wks of age regarding shank length (P<0.01) (Adeogun and Adeoye, 2004). Age significantly affects body weight in quail whereas age has no significant effect on the weight of liver, alimentary tract, gizzard and heart (Yalcin, 1995). Singh *et al*., (1981) conducted an experiment and found that the differences between birds aged 5 week and older were significant for meat and bone percentages. The differences in skin percentage were significant between birds aged 5-6 week and olders, and the differences in meat to bone ratio were significant between all slaughter ages except 7 and 8 week.

Joya *et al*., (1979) observed the dressing percentage and visceral organs (liver, heart and gizzard) weight in broiler chicks of four commercial strains and found significant differences in gizzard weight while non-significant differences in heart and liver weights depending upon strain variation. In a very recent study Akram *et al*., (2012), found significant differences in body length, keel length, drumstick circumference and shank circumference with the advancement in age. What happens with different organs weight with the advancement in age is yet not clear, so the present study has there fore been planned to explore age related changes in different body organs. Keeping this in view, the present study has therefore been planned with the major objective to investigate age related changes in body measurements and slaughter data in Japanese quail.

2. Materials and methods

The present study was conducted at Avian Research and Training (ART) Centre, Department of Poultry Production, University of Veterinary and Animal Sciences, Lahore, Pakistan. A total of 72 birds were slaughters at each stage (wk4, wk5 and wk6). So in the whole experiment 216 birds were slaughtered.

2.1. Parameters observed

a) **Before slaughtering:-** Body length, keel length, drum stick length and shank length,
b) **After slaughtering: -** Intestinal length, intestinal weight, Heart, liver, gizzard and giblets weight. Absolute values of different organs weight were taken to calculate relative weight percentage to that of live weight of the birds.

The birds were housed in quail experimental sheds [32 ft. long (L), 13 ft. wide (W) and 09 ft. high (H)] in 5 Tiers Multi-deck Quail Battery Cages with the provision of ad-libitum broiler-quail ration, prepared according to NRC (1994) standards and fresh, clean drinking water through automatic nipple drinkers.

2.2. Statistical analysis

The data thus collected were analyzed through one way ANOVA in Completely Randomized Design (CRD) and the means were compared using Least Significant Difference (LSD) test, with the help of SAS 9.1.

3. Results and discussion

Age significantly affected body measurements except intestinal length (Table 1). There is positive correlation between the age and different body measurements i.e., body length, keel length, drumstick length and shank length. Intestinal length showed no relation with age (Table 1). Similar findings were reported by Akram *et al.,* (2012) that as the age advances body length, keel length, drumstick length and shank length increases. Similarly body length showed positive and significant correlation with carcass component (Bochno *et al.,* 1999). Nsoso *et al.,* (2008) further strengthened the results of the present study and reported that body length and shank length increased significantly from 5 to 45 days of age. The analysis of body dimensions in poultry bird at different ages showed that their body length, keel length, drumstick length, shank length, increased with age (Kozaczyński 1999). In the Japanese quail the duodenum increased little in length, whereas both jejunum and ileum increased 2 to 3-fold from 1 to 70 days. Further Mitjans *et al.*, (1997) reported greater increase in intestinal length during the early life (1-14 days) of birds than that of lateral life (14-28 days).

Age significantly affected the drumstick circumference and shank circumference (Table 2). Drumstick circumference increased with age with the lowest value for 3rd week (4.46±0.03) and the highest (5.20±0.07) for 5th week. Shank circumference also increased with the advancement in age. Nsoso *et al*., (2008) also observed that shank circumference increased significantly from 5 to 45 days of age in the Japanese quail. The results of present study are in line with the findings of Akram *et al.,* (2012) who found significant differences in drumstick circumference and shank circumference with the advancement in age. The increase in shank and drumstick circumference might be considered normal physiological response of bird's body to aging until reaching sexual maturity or afterwards. Age showed significant effect on slaughtering characteristics. With the advancement of the age relative weight of liver, gizzard and Giblets decreased whereas heart and intestine increased with the advancement of age (Table 3). With the advancement in age the increase in heart weight might be attributed to increased blood circulation in order to fulfill elevated oxygen needs of growing body while increased intestinal length and weight provides more surface area for nutrient digestion and absorption in order to cater the metabolic requirements of growing bird. The results of present study are in accordance with the findings of Akram *et al,* (2012) who found significant differences in relative Liver, Gizzard and Heart, Giblets and Intestinal weight to that of live weight with the advancement of age.

Table 1
Comparison of Body length, Keel Length, Drumstick Length, Shank Length and Intestinal Length at different ages (cm)

Body Measurements (cm)	Week 3	Week 4	Week 5
Body Length	29.33±0.09^c	30.86±0.11^b	31.56±0.20^a
Keel length	5.24±0.02^c	5.61±0.02^b	5.82±0.03^a
Drumstick length	5.03±0.03^c	5.36±0.06^b	5.49±0.04^a
Shank length	3.79±0.02^b	3.91±0.02^a	3.96±0.03^a
Intestinal length	72.26±0.29	74.19±0.22	73.97±0.23

Different superscripts on different values represent significant differences among their means (P≤0.05).

Table 2
Comparison of Drumstick Circumference and Shank Circumference at different ages (cm).

Circumference (cm)	Week 3	Week 4	Week 5
Drumstick Circumference	4.46±0.03^c	4.91±0.03^b	5.20±0.07^a
Shank circumference	1.24±0.01^c	1.45±0.01^b	1.84±0.02^a

Different superscripts   on different values represent significant differences among their means (P≤0.05)

Table 3
Comparison of Relative weight of the liver, Gizzard, Heart, Giblets and Intestine at different ages.

Weight (%)	Week 3	Week 4	Week 5
Liver weight	3.15±0.04^a	3.03±0.03^b	2.46±0.04^c
Gizzard weight	3.49±0.04^a	3.34±0.04^b	2.71±0.05^c
Heart weight	0.61±0.01^c	0.70±0.01^a	0.90±0.01^b
Giblet weight	7.41±0.07^a	7.07±0.06^b	6.08±0.09^c
Intestinal weight	5.76±0.10^c	7.78±0.08^b	9.90±0.14^a

Different superscripts on different values represent significant differences among their means (P≤0.05).

4. Conclusion

With the advancement of age significant increment per week was observed in body, keel, drum stick and shank length as well as drumstick and shank circumference except intestinal length. As the age advances heart and intestinal weight percentage to that of the live weight increased, while liver, gizzard and giblets weight percentage decreased.

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