

# DIFFERENCES IN CARCASS TRAITS, SOME VITAL ORGANS AND DETECTION OF THE REGRESSION EQUATIONS OF PEKIN, MUSCOVY AND IRAQI LOCAL DUCKS

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## ABSTRACT

The existing experiment was intended to explore the differences among three breeds of duck, Pekin, Muscovy, and Iraqi local ducks, in carcass traits and internal organs. Thirty ducks (n= 10 of each breed) at age 4 months were reared at an opened scheme for five weeks. At the end of this period, before and after slaughter, the weight of all ducks were taken. Weight of carcass, thighs, back and neck, wings, testis, and ilium breast were estimated by weighing balance. Then some slaughter organs, heart, liver, and gizzard were weighted. The statistical analysis of current data showed a significant (P<0.05) higher live body weight (LBW) of Muscovy ducks compared with other breed ducks. On the other hand, carcass traits recorded a significant (P<0.05) increment in wings percentage in Pekin ducks compared with Muscovy and local ducks. Also, The statistical examination verified significant (P<0.05) increment in heart and gizzard percentages in Pekin ducks compared to other breeds. In contrast, testis percentage recorded a higher significant (P<0.05) value in local ducks than Muscovy ducks. As well as the regression equations verified for determining live body weight by slaughter traits in three breed ducks. The current results improved the vital variation in carcass feature, and internal organs weights can be influenced by the diversity of growth performance and meat quality among the three breeds.

**Key words:** Ducks, slaughter, internal organs, regression

## Introduction

Recently, the largest livestock species are poultry worldwide (FAO, 2000), it enumerates as more than thirty percent of protein for all animal consumption (Permin and Pedersen, 2000). Among the common Avian species reared for meat and/or eggs in Iraq are ducks (Al Assadi *et al.*, 2019).

Duck husbandry is done under a primitive situation like small groups in villagers, while, recently domestic ducks have been considered a dietary source in many countries like Iraq (Churry and Morris, 2008 and Schenk *et al.*, 2016). The efficiency of digested foods depends on their quality and nutritional constituents (Solomon *et al.*, 2007). Contrasting other avian animals, ducks guzzle large amounts of feeds but being feature is the best signal of a significant performance rate and fast growth. In a free management regime, ducks can survive even in feed scarcity (Solomon *et al.*, 2007). Ducks can resist hot environmental conditions (Schenk *et al.*, 2016). Meat and eggs production in avian species depends on birds' health status, species, gender, nutrition, genetics and managemental systems (Qamar *et al.*, 2019; Khafaji *et al.*, 2020).

Pekin and local ducks are common breeds of waterfowl in Iraq that provide meat and eggs (Ding *et al.*, 2021). Pekin ducks have numerous advantages like high immunity against disease and high feed conversion efficiency, fecundity and growth performance. Pekin ducks are counting approximately 70% of the meat duck manufacture annually in Asia (Zheng *et al.*, 2014).

Muscovy ducks are the dominant household duck among villagers in some countries; because of their ability to tolerate adverse environmental conditions, they are considered as a significant protein source and revenue to rural farmers (Oluyemi

and Ologbobo, 1997). The popularity of Muscovy ducks belongs to conformation characteristics, as well as to high leg and breast meat contents and lower fat contents at subcutaneous, skin and carcass abdomen that fulfills consumers need to ducks meat in comparison to the carcass of Pekin ducks (Biesiada-Drzazga, 2012). Although numerous benefits, the production of Muscovy ducks is non-significant in some countries due to higher cost of nutrition and prophylaxis, low egg production and prolonged rearing period (Rózewicz and Kaszperuk, 2017).

However, limited studies reported the significance of variation of live body weight (LBW), carcass parameters in Muscovy, Pekin, and local Iraqi ducks that reflects performance and equality. This article intended to notice the differences among Muscovy, Pekin, and local Iraqi ducks on LBW, carcass features, and some internal organs, also, to study the regression equations between live body weight with all studying parameters in Muscovy, Pekin, and local Iraqi ducks below Iraqi environmental state.

## Materials and Methods

Thirty males of each Pekin, Muscovy, and Iraqi local ducks at age of 4 months were reared at Kerbala University/ Agriculture collage / Animal Production department from 1/10/2020 to 12/11/2021. The ducks raised at opened system and supplemented with water and diet as free.

After five weeks, all ducks were weighted live and then slaughtered. The weight of carcass, thigh, wings, back and neck, gizzard, breast, liver, heart, and testis was measured, then calculated the percentage of carcass, wings, breast, thigh, gizzard, heart, testis, and liver. Also, the equations of the regression were calculated.

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**Statistical analysis**

The present data were tested by analyzing variance (SAS, 2001). Significant changes among groups were verified via Duncan's test at level 0.05.

**Results and Discussion**

The comparison of mean live body weight (g), carcass, and breast percentages parameters among ducks breed are presented in Table 1. Significant change ( $P < 0.05$ ) was observed among other two duck breeds and Muscovy duck breed in live body weight (g) parameter with highest value in Muscovy ducks in compared with other two duck breeds. At the same time, breast and carcass percentages were noted non significant ( $P > 0.05$ ) among all three ducks breed.

Higher Live body weight percentage of Muscovy as compared to local and Pekin ducks may be attributed to breed, sex, and genetic factors that influence growth due to sex-linked gene and autosomal chromosome that causes higher body weight of male Muscovy ducks than male Pekin and local ducks (Tai and Rouvier, 1998, Al Assadi *et al.*, 2019, and Khafaji *et al.*, 2019). The feed conversion efficiency of Pekin and local ducks are less as compared to Muscovy duck; besides this another reason that can explain the current variation in live weight is associated with feed consumption preference among these breeds (Bochno *et al.*, 1994) which reflects on live body weight of each breed in current article. In Muscovy duck, numerous elements, direct and indirect, can impact adult weight that is the major economic trait of the ducks (Ogah *et al.*, 2008).

Table 2 displays the differences of some slaughter parameters in Pekin, Iraqi Local, and Muscovy ducks. The statistical analysis presented a significant increase ( $P < 0.05$ ) in wings percentage in Pekin ducks when compared with other ducks breed. While other parameters, back and neck, and thigh

percentages, did not show significant changes ( $P > 0.05$ ) among duck breeds. The higher wings percentage in Pekin duck may be due to higher content of fat and skin in this region as compared with local and Muscovy ducks, rapid growth during the starting phase in Pekin resulted in rapid fat deposition (Farhat *et al.*, 1998). These variations may be suggested that fraction of energy intake toward fatty and/or non-fatty tissues is altered among these breeds (Farhat *et al.*, 2001). Non significant difference was observed in other two parameters.

The percentages of vital organs (g) in Pekin, Iraqi Local, and Muscovy ducks are explained in Table 3. The statistical analysis demonstrated significant ( $P < 0.05$ ) difference in the testis and liver percent in Local Iraqi ducks compared to Muscovy ducks' values. These differences may be attributed to the genetics and age factor. In Muscovy ducks, the giblets contents (liver, heart, and gizzard) decreases with age (Murawska, 2012). Organs weight may be influenced by fat content of tissues as fat deposited in the abdomen and internal organs. Muscovy ducks possess the lowest fat deposition in the skin, organs, and abdomen as compare to other ducks breeds (Rózewicz and Kaszperuk, 2017).

Table 4 showed regression equations for measuring live body weight (y) in Pekin, Local, and Muscovy ducks. Primarily, the independent traits in these equations were a carcass, back and neck, breast and wings, liver, ilium, testis, gizzard, and heart weights (X). The current data refer to easily calculate the LBW in experimental ducks breed independent of slaughter features and vital organs, as well as its agreement with findings of Saatci and Tulku (2007). They used regression analysis to assess body weight by measurable body parts (chest girth and body length). These results are supported by Raji *et al.* (2009), they used regression equations for measuring body weight by body length, chest width, and girth in Muscovy ducks with accuracy (Raji *et al.*, 2009).

Table 1: Comparison of live body weight (g), carcass and breast percentages parameters among Pekin, Local, and Muscovy ducks.

Parameters Species	Live body weight (g)	Percentage of carcass	Percentage of breast
Pekin ducks	1933.5 ±74.25 b	67.99 ±0.76 a	17.64 ±1.30 a
Local ducks	1806.5 ±39.06 b	71.04 ±0.56 a	19.61 ±0.37 a
Muscovy ducks	3406.5 ±281.73 a	75.54 ±3.76 a	20.45 ±2.29 a

Data represent mean ± SE.

Different superscripts in column differ significantly at  $P < 0.05$ .

Table 2: Comparison of slaughter traits among Pekin, Iraqi Local and Muscovy ducks

Parameters Species	Percentage of back and neck	Percentage of wings	Percentage of thighs
Pekin ducks	24.52 ±0.47 a	13.38 ±0.48 a	16.22 ±1.70 a
Local ducks	26.51 ±0.70 a	8.94 ±0.16 b	13.71 ±0.60 a
Muscovy ducks	25.98 ±2.02 a	8.94 ±0.38 b	14.95 ±0.47 a

Data represent mean ± SE.

Different superscripts in column differ significantly at  $P < 0.05$ .

Table 3: Comparison of some vital organs percentages among Pekin, Local and Muscovy ducks.

Parameters Species	Percentage of liver	Percentage of heart	Percentage of ilium	Percentage of gizzard	Percentage of testis
Pekin ducks	1.437 ±0.03c	0.712 ±0.04 a	3.178 ±0.29 a	2.620 ±0.07 a	2.079 ±0.63 a
Local ducks	1.567 ±0.12a	0.743 ±0.07 a	3.306 ±0.63 a	2.127 ±0.09 b	2.571 ±0.26 a
Muscovy ducks	1.125 ±0.01b	0.910 ±0.06a	3.178 ±0.24 a	2.102 ±0.18b	0.416 ±0.04 b

Data represent mean ± SE.

Different superscripts in column differ significantly at  $P < 0.05$ .

Table 4: Regression equations of Live body weight independent on slaughter characters in Pekin , Local and Muscovy ducks.

Parameters	Regression equations of Pekin ducks	Regression equations of local ducks	Regression equations of Muscovy ducks
Live body weight and carcass weight	$\hat{y}=(-67.34)+ 0.71 X$	$\hat{y}=177.82+ 0.61 X$	$\hat{y}=1051.79+ 0.44 X$
Live body weight and thighs weight	$\hat{y}=(-681.02) + 0.51 X$	$\hat{y}= ( - 267.89) + 0.28 X$	$\hat{y}=145.21+ 0.10 X$
Live body weight and breast weight	$\hat{y}=583.21 +(-0.12) X$	$\hat{y}=(-217.02) + 0.31 X$	$\hat{y}=409.24+ 0.08 X$
Live body weight and wings weight	$\hat{y}=56.10 + 0.06X$	$\hat{y}=(- 167.73 )+ 0.19X$	$\hat{y}=159.41+ 0.08 X$
Live body weight and back and neck weight	$\hat{y}=(-280.19)+0.38X$	$\hat{y}=178.97+0.16X$	$\hat{y}=625.57+ 0.04 X$
Live body weight and liver weight	$\hat{y}=5.25+0.01X$	$\hat{y}=0.29+0.01X$	$\hat{y}=4.03+ 0.01 X$
Live body weight and heart weight	$\hat{y}=12.68+ 0.0006X$	$\hat{y}=51.86+ ( - 0.02)X$	$\hat{y}=14.27+ 0.003 X$
Live body weight and gizzard weight	$\hat{y}=8.99+0.02X$	$\hat{y}=52.2+(-0.007)X$	$\hat{y}= ( - 6.73)+ 0.02 X$
Live body weight and ilium weight	$\hat{y}=20.54+ 0.02X$	$\hat{y}=(-319.79)+0.021X$	$\hat{y}=55.46+ 0.01 X$
Live body weight and testis weight	$\hat{y}=186.57+(-0.07)X$	$\hat{y}=(-41.29)+0.04 X$	$\hat{y}=16.21+ (-0.0007) X$

**Conclusion**

The results accomplished from this research showed that there are difference in in live body weight, and carcass weight, as well as weights of some organs among Muscovy, Pekin and local ducks. Also these improved equations of regression can be used to reliably predict the live body weight with carcass features in these three duck breeds. In the future, numerous investigates are required to estimate the differences in reproductive traits among these breeds.

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