Evaluation of Growth and Feeding Characteristics of Indigenous Chicken Ecotypes of Kenya

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Abstract

The domestic Indigenous chicken (Gallus gallus domesticus L.) is one of the animal genetic resources that is known to be widespread in Africa. Irrespective of its importance, about 38% poultry population in the world is classified as at risk status. Indigenous chickens (IC) ecotypes exhibit differences in production potentials. The performance of IC ecotypes can be upgraded for economic significance through selection and breeding. However, many of these efforts have not flourished but instead offered new challenges such as amplified cost of production. Eggs of each Kenyan (IC) were collected from the respective AEZ. An on station artificial hatching, growth and feed utilization evaluation was conducted at the University of Eldoret (UoE). Stratigraphic Centurion XVI.I was used for analysis. Highest mean egg weight were from LM ecotype (44.59±3.15 SD) significantly different (P<0.05). Proportions of incubated eggs as well as and those that hatched was the same for all ecotypes (p>0.05). HB ecotype had the lowest proportion of unfertile eggs (p<0.05). A large percentage of eggs with dead embryo came from EM, TR and LM ecotypes. A large fraction of eggs with chicks that were Dead before Hatch came from EM ecotype (38.24%). The average hatching weight of chicks from all ecotypes was positively correlated with egg mean weight. The HB ecotype had the highest weight gain followed by TR ecotype for chicks. HB ecotype had the highest mean weight gain per bird (985.63±154.80) insignificantly different from all other ecotypes assessed ($F_{0.05\ (4,\ 41)}$ =2.29, p=0.0761). There was no significant difference in ADG (g) among ecotypes irrespective (p>0.05). The highest Total Feed Intake per bird in g was recorded in HB (p<0.05). HB ecotype recorded the highest Average Daily Feed Intake (p<0.05). LM ecotype recorded the highest Feed Conversion Ratio of 2.35±0.25 while EM and TR recorded the lowest (p<0.05). In conclusion, the studied indigenous chicken populations in Kenya have demonstrated high variation in egg weight, egg hatchability characteristics and body weight gain as well as reproduction performance between and within ecotypes. This offers a prospect to improve on IC productivity as far as feeding and feed conversion are of concern. In order to conserve IC genetic resources, Molecular characterization and Marker Assisted Selection and breeding towards an efficient feed utilization breed of indigenous chicken is recommended.

Keywords: Kenya, indigenous chickens (IC), ecotypes, Growth and Feeding

INTRODUCTION

The domestic Indigenous chicken (IC) (*Gallus gallus domesticus L.)* is one of the animal genetic resources that is known to be widespread in Africa (Sinoya, 2017). One of the utmost important traits of IC is their hardiness against harsh environmental situation and poor husbandry put into practise without much forfeiture in production

(Mahendra, 2016; Chesoo, Wanga, & Omega, 2020). It is found within the homesteads under scavenging conditions playing vital socio-cultural as well as economic role for people living among the resource poor and marginalized low-income countries especially in sub-Saharan Africa (Asresie, Eshetu, & Adigrat, 2015; Chesoo *et al*., 2016; Ngeno, 2016).

The role of Indigenous Chicken (IC) for rural livelihoods in Africa is indispensably high (Mahendra, 2016; Chesoo et al., 2016). In east Africa, Indigenous chicken, form part of balanced farming system playing significant roles as source of high-quality animal protein, income and socio-cultural tenets of rural households (Chesoo et al., 2015). According to King'ori (2011) and Kagira, Kanyari, Maingi, Githigia & Karuga (2010), 90% of rural communities keep over 31 million indigenous chicken under free range conditions in Kenya.

Irrespective of its importance, about 38% poultry population in the world is classified as at risk status with IC showing a declining trend (Hoffman, 2010). Some endeavours have been completed on cataloguing of indigenous chicken ecotypes in east Africa by various researchers (Asresie, Eshetu, & Adigrat, 2015; Chesoo *et al*., 2016; Ngeno *et al*., 2016; Getu, Alemayehu & Alebie, 2015). The regional Indigenous chicken are a reservoir of genes (Mwambene, Kyallo, Machuka, Githae, & Pelle, 2019) which need to be identified and conserved to cope with the ever changing environmental conditions, improvement of quantitative traits, selection and breeding for disease tolerance, enhancement of value addition and future utilization (Cabarles, 2013).

Indigenous chickens (IC) ecotypes exhibit differences in production potentials (Ng'eno et al, 2011; Variation has been reported in in different counties such as Ethiopia by Dinka, Chala, Dawo, Bekana, & Leta (2010), Zimbabwe by Permin, Esmann, Hoj, Hove & Mukaratirwa (2002), Botswana by Moreki & Chiripasi (2011) and in Kenya by Ng'eno (2011) and Magothe et al. (2012). The performance of IC ecotypes can be improved for traits of economic importance through selection and breeding. However, voluminous of these efforts have not flourished nevertheless in its place presented novel challenges such as amplified cost of production in Kenya.

METHODOLOGY

The study sites

The study was conducted at the Animal Science Department farm of the University of Eldoret (UoE) Uasin Gishu County, Kenya. The farm is situated at latitude 0^{o} 31"N, longitude 35^{o} 17" E, with an elevation of 2154M above sea level. An average unimodal rainfall pattern of 1000 mm to 1520 mm per annum has been recorded over the last ten years. The rains span from February to August and the temperatures of the site ranged from 23.6^{o}C day to 9.6^{o}C night (Chesoo, Oduho, Kios, & Rachuonyo, 2014).

Origin of the study animals

Kenyan Indigenous chicken (IC) ecotypes eggs were sourced from five agro-ecological Zones in Kenya. The agro-ecological Zones considered were Western Highland, North Western Arid and Semi-Arid lands, Coastal Lowlands and Midlands, Lake Shore and the Central Highlands. The associated IC ecotypes were; EM (Elgeyo Marakwet in Western Highland), TR (Turkana in North Western Arid and Semi-Arid lands), LM (Lamu in Coastal Lowlands and Midlands), HB (Homa bay in Lake Shore), and MR (Meru in Central Highlands) and as portrayed in figure 1.

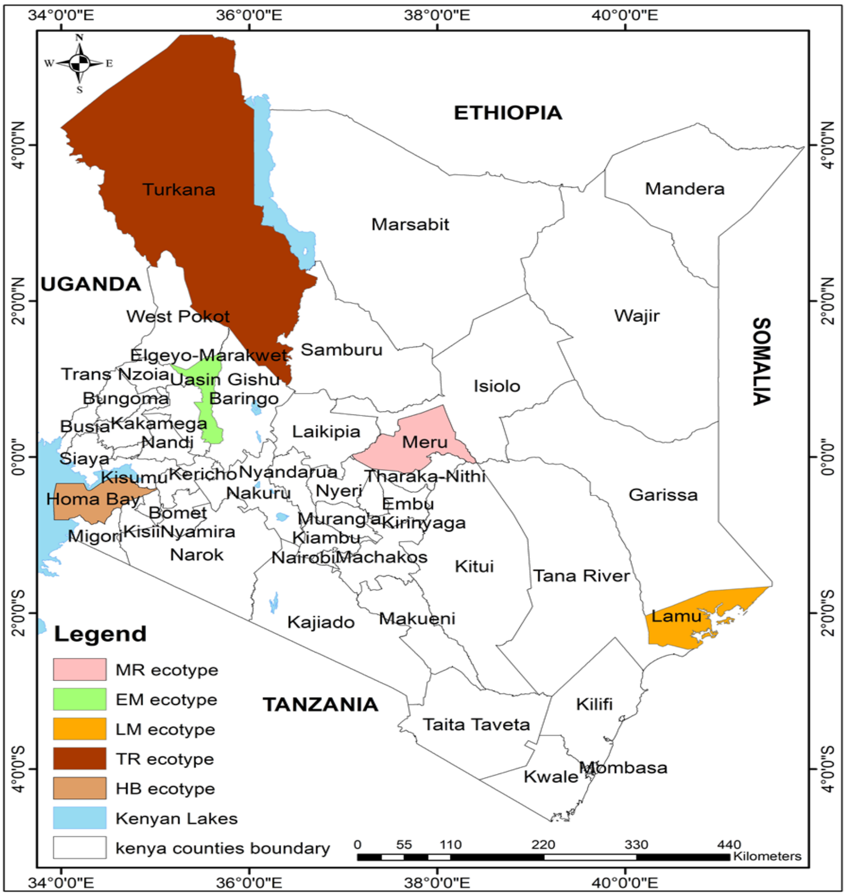

Figure 1: Map showing counties where ecotypes eggs were sourced from

Study animals and management

Eggs of each Kenyan indigenous ecotypes were collected from the respective agro ecological zone. An on station artificial hatching, growth and feed utilization performance assessment of the selected Kenyan Indigenous chickens' ecotypes was conducted at the University of Eldoret (UoE) Animal Science Department farm.

Prior to incubation, eggs were selected for physical quality and weighed. The hatchery room was prepared and sanitized using 1% formalin spray while 17 g potassium permanganate and was used to fumigate for hygiene. Candling followed before and on 7 and 18 days of setting the eggs inside the incubator. On hatching, Brooder and grower houses with all poultry equipment such as feeders and water drinkers as well as beddings were disinfected by 2% formalin day prior to the introduction of the birds. The house floor was bedded with straw and heated with infrared bulbs. The chicks were supplied and fed with formulated starter ration as portrayed in table1 and clean potable *ad lib* water for six weeks and weaned with formulated grower ration (table 1) in grower house for another eight weeks. In accordance with the producer's recommendation, all birds from day one was mmunized against Marek's disease, Gumboro disease at eighteen, twenty-four and thirty days old while Fowl Typhoid was at five and eighteen days old, Newcastle disease at twenty-four days and at six weeks while growers were vaccinated for Newcastle disease and infectious Bronchitis at week six and thirteen of age as per veterinarian's recommendations.

Table 1: Formulated Chick Starter and growers Mash (100 Kg)

	Qty (Kg)	MEKcal/Kg	%CP	%Lys	% Meth	%C F	%Ca++
Chick Starter Mash (100 Kg):	100.0	2825	19.67	0.9235	0.9235	4.1935	0.9489
Growers Mash (100 Kg):	100.0	2915.5	17.15	0.8605	0.3937	9.18	0.8098

Research Design

The sourced eggs were hatched and resulting chicks put into brooder heated by infrared electric bulbs for six weeks of age then transferred to a rearing house and taken care for seven weeks. Free access mode of feeding was adopted starting at 0800 hours. For chicks, food provided was not measures as they were to eat as they felt like but for growers, food refusals for growers were weighed and recorded daily to estimate food intake while their body weight was recorded on weekly basis.

Data Collection

Egg weight, egg hatchability, growth, Feed intake (FI), weight gain, food conversion ratio variables were taken as follows: FI was recorded on daily basis for growers, birds' live weight was recorded on a weekly basis, Food conversion ratio (FCR) was computed as the ratio of feed taken over weight gained on a weekly basis.

Data Analysis

The Stratigraphic Centurion XVI.I was used for analysis. Analysis of variance was carried out to test the differences in means of Ecotypes egg weight and Performance of ecotypes Growers. Tukey's pairwise test was used to pinpoint means that were significantly different. Chi square goodness of fit test was used to test for significant differences in percentages of Ecotypes Egg hatchability characteristics while simple linear regression model was used to test for significant difference in linear relationship between the mean weight and age of ecotypes. Figures and tables were used to present and illustrated the findings.

RESULTS

Ecotypes Egg Mean Weight

Mean weight of eggs from five Kenyan Indigenous Chicken ecotypes were assessed. Highest mean egg weight was from LM ecotype (44.59±3.15 SD) followed by MR ecotype with a mean egg weight of 43.71 g with a standard deviation of 4.36 significantly different ($F_{0.05\,(4,\,244)}$ =4.739, P=0.0011) from the lowest mean egg weight recorded from TR (41.96±5.52 SD) as portrayed in figure 1. Mean significant difference was between LM and TR (p= 0.0217), and HB and LM (p=0.0021).

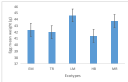

Figure 1: Mean Egg Weight (g)

Ecotypes Egg Hatchability Characteristics

Proportions of incubated eggs was the same for all ecotypes (χ^2=5.1, d.f. =4, p = 0.2772) as illustrated in table 1. Likewise, proportion of chicks that hatched did not differ between the ecotypes (χ^2=6.8, d.f.=4, p = 0.1468). Lowest percentage of unhatched eggs (9.47%) were from HB ecotype significant difference from other ecotypes (χ^2=9.8, d.f.=4, p =0.0439).

Reasons for failure to hatch were established which included unfertile eggs, Dead Embryo (DE), Dead before Hatch (DD), Peeped Failed (PF), Cracked Shell (CS) as well, as Not Known (NK). HB ecotype also had the lowest proportion (3.64%) of unfertile eggs followed by MR ecotype (10.91%) significantly different from other ecotypes (χ^2=27.4, d.f.=4, p = 0.0000). A large percentage of eggs with dead embryo (DE) came from EM (23.08%), TR (26.92%) and LM (26.92%) ecotypes with a significantly lower proportion (7.69%) coming from HB ecotype (χ^2=13.8, d.f.=4, p = 0.0000) as portrayed in table 2. A large fraction of eggs with chicks that were Dead before Hatch (DD) came from EM ecotype (38.24%) significantly different from the lowest fraction (8.82%) recorded for MR ecotype (χ^2=22.85, d.f.=4, p= 0.0001). there was no significant difference) between the ecotypes as far as Peeped Failed (PF) (χ^2=8.35, d.f.=4, p = 0.0796) as well as Cracked Shell (CS) (χ^2= 6.76, d.f.=3, p = 0.0800) was of concern but a significant difference in Not Known (NK) reasons for hatching of eggs between the ecotypes (χ^2= 13.25, d.f.=4, p = 0.0101) as illustrated in table 1.

Table 1: Ecotypes Egg hatchability characteristics

	EM	TR	LM	HB	MR	Chi- square (χ^2)
Eggs incubated	68 (25.76)	59 (22.35)	59 (22.35)	33 (12.50)	45 (17.05)	χ^2=5.1 d.f.=4 p = 0.2772
Chicks hatched	22 (29.73)	12 (16.22)	12 (16.22)	15 (20.27)	13 (17.57)	χ^2=6.8 d.f.=4 p = 0.1468
Unthatched eggs	46 (24.21)	47 (24.74)	47 (24.74)	18 (9.47)	32 (16.84)	χ^2=9.8 d.f.=4 p = 0.0439
Not fertile (NF)	15 (27.27)	16 (29.09)	16 (29.09)	2 (3.64)	6 (10.91)	χ^2=27.4 d.f.=4 p = 0.0000
Dead Embryo (DE)	6 (23.08)	7 (26.92)	7 (26.92)	2 (7.69)	4 (15.38)	χ^2=13.8 d.f.=4 p = 0.0000
Dead before Hatch (DD)	13 (38.24)	6 (17.65)	6 (17.65)	6 (17.65)	3 (8.82)	χ^2=22.85 d.f.=4 p= 0.0001
Peeped Failed (PF)	8 (20.51)	8 (20.51)	8 (20.51)	4 (10.26)	11 (28.21)	χ^2=8.35 d.f.=4 p = 0.0796
Cracked Shell (CS)	1 (14.29)	2 (28.57)	2 (28.57)	-	2 (28.57)	χ^2= 6.76 d.f.=3 p = 0.0800
Not Known (NK)	3 (10.34)	8 (27.59)	8 (27.59)	4 (13.79)	6 (20.69)	χ^2= 13.25 d.f.=4 p = 0.0101

Numbers in brackets represent proportion in percentages

Ecotypes' Chicks in Weight Gain (G) From Day Old to Six Weeks of Age

Chick growth was plotted against age for all ecotypes. The HB ecotype had the highest weight gain with a correlation coefficient of 0.9388 and a linear equation of HB = -65.4714 + 50.2048*age with a statistically significant difference (R^2=0.88, β=50.21, $F_{0.05\ (1,\ 6)}$ =44.58, p=0.0005). It was followed by TR ecotype with a linear equation of; TR = -71.0607 + 46.2274*age (R^2=0.91, β=46.22, $F_{0.05\ (1,\ 6)}$ =57.36, p=0.0003), MR ecotypes with a linear positive weight gain equation of; MR = -63.7857 + 46.144*age (R^2=0.92, β=46.14, $F_{0.05\ (1,\ 6)}$ =73.53, p=0.0001), LM ecotype with a linear equation of: LM = -60.8179 + 40.2095*age (R^2=0.83, β=40.21, $F_{0.05\ (1,\ 6)}$ =31.31, p=0.0014) while EM ecotype recorded the lowest weight gain with a linear equation of; EM = -37.7429 + 29.5262*age (R^2=0.88, β=2 9.53, $F_{0.05\ (1,\ 6)}$ =42.51, p=0.0006) as portrayed in figure 3.

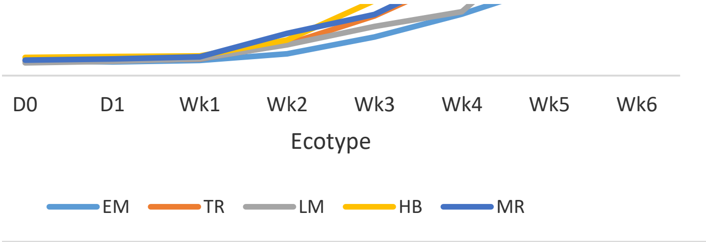

Figure 3: Chick growth

Ecotypes' Growers Weight Gain (G) From Eight Weeks to Twelve Weeks of Age
Ecotypes Growers weight in grams was weighed from week seven (wk. 7) to week fourteen (wk. 14). At week seven, TR ecotype had the highest weight followed by HB ecotype while EM ecotype showed the lowest weight. Generally, HB ecotype had the highest weight gain with a constant of 138.95 grams per week (R^2=0.99, $F_{0.05\ (1,\ 6)}$ =1091.18, p<0.0001) followed by HB (β=115.857, R^2=0.99, $F_{0.05\ (1,\ 6)}$ =1927, p<0.0001), MR ecotype (β= 121.92, R^2=0.99, $F_{0.05\ (1,\ 6)}$ =639.55, p>0.0001), EM ecotype (β=115.54, R^2=0.98, $F_{0.05\ (1,\ 6)}$ =589.79, p>0.0001) while LM recorded the lowest weight gain per week with a constant weight gain of 91.06 g per week (R^2=0.99, $F_{0.05\ (1,\ 6)}$ =2602.65, p>0.0001) as portrayed in figure 4.

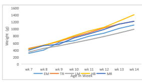

Figure 4: Growers' growth

Performance of Ecotypes Growers
Mean weight gain per bird was assessed for all ecotypes. HB ecotype had the highest mean weight gain per bird (985.63±154.80) insignificantly different from all other ecotypes assessed ($F_{0.05\ (4,\ 41)}$ =2.29, p=0.0761) as illustrated in table 2. There was no significant difference ($F_{0.05\ (4,\ 51)}$ =2.25, p=0.0759) in Average Daily Gain (g) among ecotypes irrespective of HB ecotype having the highest of 17.60±2.24 g as illustrated in table 2. The highest Total Feed Intake per bird in g was recorded in HB (1537±55.53) and MR (1463.29±67.31) ecotypes while the lowest (872.73±30.37) was recorded in

EM ecotypes. There was a significant difference in Total Feed Intake per bird in g among ecotypes ($F_{0.05\ (4,\ 30)}$ =35.77, p=0.0000). Mean significant difference was between EM and TR (p=0.0001), LM and EM (0.0001), HB and EM (p=0.0001), MR and EM (0.0001) ecotypes as illustrated in table 2. HB ecotype recorded the highest Average Daily Feed Intake in g (27.45±0.99) followed by MR ecotype (26.13±1.20) while EM ecotype recorded the lowest significant Average Daily Feed Intake of 15.58± 0.54 ($F_{0.05\ (4,\ 30)}$ =35.77, p=0.0000). Mean significant difference was between EM and TR (p=0.0001), LM and EM (0.0001), HB and EM (p=0.0001) and between MR and EM (0.0001) ecotypes as illustrated in table 2. As far as Feed Conversion Ratio (Feed gain) was of concern, LM ecotype recorded the highest of 2.35±0.25 while EM and TR recorded the lowest of 1.03±0.10 and 1.04±0.10 respectively as illustrated in table 2. ($F_{0.05\ (4,\ 30)}$ =4.34, p=0.0069). Mean significant difference was between LM and EM (0.0208), MR and EM (0.0187) and between EM and TR (0.0208).

Table 2: Means for the Performance of indigenous chicken ecotypes Growers (7 - 14 weeks) under on station management condition in Kenya

	Ecotypes (Mean±SE)						
	EM	**TR**	**LM**	**HB**	**MR**	**F**	**p-value**
Gain (g/bird)	768.21± 80.91	633.13 ± 44.01	633.13 ± 44.01	985.63 ± 154.80	916.88 ± 132.55	2.29	0.0760
Average Daily Gain (g)	14.47 ± 1.36	11.64 ± 0.73	11.64 ± 0.73	17.60 ± 2.24	14.75 ± 2.16	2.26	0.0759
Total Feed Intake / bird (g)	872.73± 30.37^{a}	1389.71± 23.89^{b}	1389.71± 23.89^{abc}	1537.16± 55.53^{bd}	1463.29± 67.31^{b}	35.77	0.0000
Average Daily Feed Intake (g)	15.58 ± 0.54^{a}	24.82 0.43^{b}	24.82 0.43^{abc}	27.45 0.99^{bd}	26.13 ± 1.20^{b}	35.77	0.0000
Feed Conversion Ratio (Feed gain)	1.03± 0.10^{a}	2.35± 0.25^{b}	2.35± 0.25^{bc}	1.68± 0.31	2.36± 0.41^{bce}	4.34	0.0069

^{abcde} *Means within a row followed by different superscripts are significantly different (p<0.05.*

DISCUSSION

Ecotypes Egg Mean Weights

Findings indicates that LM ecotype had the highest mean egg weight followed by MR ecotype while TR had the lowest egg mean weight. Highest egg mean weight of LM ecotype can be attributed to its agro ecological zone which has ample amount of food for scavenging birds. This concurs with finding of Tadelle, Kijora and Peters (2003) that dissimilar breeds, ecotypes and strains of indigenous chicken are well adjusted to their production environment. According to Chesoo, Kiptanui and Kitilit (2018), the LM ecotype, (Kuchi) has been reported to produce eggs with an average weight of 50g per egg on an on station management. This has been attributed to its superiority in terms of mature body weight of 6-9 kg and 3-6kg for males and females respectively compared to other indigenous ecotypes in Kenya. In addition to egg size, a mature LM ecotype (Kuchi) can reach 40 eggs per clutch (Chesoo et al., 2014; Ngeno, 2015). Fayeye, Sola-Ojo, Obadare & Ayorinde (2017) adds that egg weight can be affected by additional factors such as the age of the hen, sexual maturity age and weight of the hen.

Wambui, Njoroge & Wasike (2018) indicated that the major cause of dissimilarities in egg qualities especially weight is greatly accredited to the approach of management of the indigenous flock in terms of nourishment, housing, breeding program and wellbeing management.

Ecotypes Egg Hatchability Characteristics

Proportion of chicks that hatched did not differ between the ecotypes. This could have been attributes to the fact that the hatching was an onsite as well as use of an artificial incubation system. For the hatchability characters, ecotype had little consequence on hatchability of eggs. The findings are in consistent with those of King'ori (2011). King'ori (2011) in a review paper added that potency and hatchability of the eggs is affected by both hereditary and environmental factors. King'ori (2011) and Wambui, Njoroge & Wasike (2018) went ahead to state the most persuasive egg parameters that influence hatchability include; shell porosity, thickness, egg weight, maximum breadth to length ratio (in this case shape index) as well as the consistency of the contents. The hatchability percentage of chickens in the present study is equivalent with the results of Bobbo, Yahaya and Baba (2013) in three Phenotypes of Local Chickens in Adamawa State.

Reasons for failure to hatch were established which included unfertile eggs, Dead Embryo (DE), Dead before Hatch (DD), Peeped Failed (PF), Cracked Shell (CS) as well, as Not Known (NK). HB ecotype also had the lowest proportion of unfertile eggs while a large percentage of eggs with dead embryo (DE) came from EM, TR and LM ecotypes.

The chicks mean hatching weight from all ecotypes was positively correlated with egg mean weight. This is in line with findings of Gakige, King'ori, Bebe and Kahi (2016) that in indigenous chicken ecotypes, the hatching weights of chicks follow the weight of eggs pattern in parental population. A study by Magothe et al. (2010) showed the same trend. Bobbo, Yahaya and Baba (2013) in their result indicated significant positive correlation for all phenotypes between hatchability on fertile eggs and chick weight.

A large fraction of eggs with chicks that were Dead before Hatch (DD) came from EM ecotype. This could have been attributed to high temperatures in the respective agro ecological zone that may have resulted to embryo desiccation. This is in line with findings of Sharaf, Taha and Ahmed (2010) that dead embryo might be due to ambient temperature among others such as genetic factors. Poor nutrition, periodic outbreak of disease, poor management and availability of scavenging feedstuff resources and feed additions can affect the Ecotypes Egg hatchability characteristics. The findings are in line with those of King'ori (2011) that inadequate nutrients in the egg and exposure to surroundings that do not meet the needs of the developing embryo as well as lethal genes affect hatchability of fertile eggs.

Ecotypes' Chicks in Weight Gain (G) From Day Old to Six Weeks of Age

The HB ecotype had the highest weight gain followed by TR, MR, LM while EM ecotype recorded the lowest weight gain. Highest weight gain in HB ecotype can be attributes to presence of scavenging food as well as food supplements full with proteins especially from *Silver cyprinid* commonly referred as *omena*. High temperatures in HB, TR, LM ecotypes agro ecological zones could also facilitate a higher weight gain in chicks. Genetic similarities between the birds from the agro ecological zones could also be the factors leading to similarity in chicks in weight gain among the ecotypes. The findings are in line with Tadelle et al (2003) that there is a large discrepancy in growth potentials amongst the different indigenous chicken ecotypes, breeds and strains that are well adapted to their productive environment.

Ecotypes' Growers Weight Gain (G) From Eight Weeks to Twelve Weeks of Age
The mean body weight gain of the indigenous chicken ecotypes from eight weeks to twelve weeks of age reported in this study concurs with those of Chesoo et al (2018). The growth presentations of ecotypes studied underlined the differences amongst ecotypes with HB having remarkably greater progression intensities which may be accredited to dissimilarities in feed conversion and foraging ability concuring with results of Nge'no (2011) and Tadelle et al. (2003).

Performance of Ecotypes Growers
Mean weight gain per bird was assessed for all ecotypes. HB ecotype had the highest mean weight gain per bird with no significant difference among ecotypes. This could have been attributed to the fact that the experiment was an intensive one involving an onsite management rather than allowing chicken to scavenge in their local habitats.

The highest Total Feed Intake per bird in g was recorded in HB. This lead to the highest Mean weight gain per bird in this ecotype. The average Daily Feed Intake recorded in HB ecotype can be illustrated by the strong relationship existing in mean body weight gain in its genetic line.

As far as Feed Conversion Ratio (Feed gain) was of concern, LM ecotype recorded the highest while EM and TR recorded the lowest. This can be attributed to somewhat large differences between ecotypes with some showing remarkably higher level of performances than other indigenous chicken ecotypes. The findings are in line with those of Chesoo et al. (2016) that LM ecotype has a high feed conversion ratio as compared to other known indigenous chicken ecotypes in Kenya. Kuchi chicken is known to utilize a low energy diet under supplementation in free-ranger management system. It is remarkably noted that some local indigenous chicken ecotypes have higher feed conversion ratio with example of Kuchi which in this case denoted as LM ecotype. According to Ng'eno (2011), Tadelle (2001) and Gakige et al (2016) in their findings, feed conversion efficiency results to a large discrepancy in growth and feed utilization between ecotypes. This is supported by findings of Tadelle, Kijora and Peters (2003) in Ethiopia as well as in other parts of tropics that whenever evaluation schemes are implemented, there has been reports of highly reproductive indigenous chicken ecotypes as compared to others.

CONCLUSION AND RECOMMENDATIONS

The studied indigenous chicken populations in Kenya have exhibited high variation in ecotypes' egg weight, egg hatchability characteristics and body weight gain as well as reproduction performance. In order to conserve IC genetic resources, Molecular characterization and Marker Assisted Selection and breeding towards an efficient feed utilization breed of indigenous chicken is recommended.

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Biodata

Ben K. Chesoo is pursuing a Doctorate Degree in Animal Physiology at the Department of Biological Sciences in the School of Science, University of Eldoret. He is involved in research work pertaining to animal breeding.

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