PERFORMANCE TRAITS AND SURVIVAL RATE OF OSTRICH *Struthio Camelus* (Linnaeus, 1758) CHICKS IN CAPTIVITY

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ABSTRACT

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Enhancing the survival rate of ostrich chicks has been a major challenge in ostrich farming. This study aimed at determining the survival rate of ostrich chicks. The study was conducted at the Teaching and Research Farm, Osun State University Ejigbo Campus, Ejigbo, Osun State, Nigeria for a period of 12 weeks. Fifteen hatchlings purchased at the Veterinary Research Institute, Vom, near Jos, Plateau State were brooded. The ostriches were put in a small paddock. Anti – stress and antibiotics were administered after their arrival.The birds were raised under intensive housing system. The findings revealed that the chicks showed progressive increase in weight for the first six weeks of the study. Feed Conversion Ratio (FCR) for the first six weeks of life are 3.24±0.98, 1.61±0,06, 1.14±0.08,0.87±0.07±,0.81±0.02,0.49±0.12 respectively.66.66% mortality was recorded within six weeks of age with the total loss amounting to ten out of fifteen hatchlings. The study thus looked at chicks survivability of ostrich as one of the major factors impeding the success rate of ostrich husbandry in the farm. Therefore, further research should be conducted on how to improve the survival rate of ostrich in captivity.

INTRODUCTION

Ostrich is the largest living bird in the world and indigenous to the semi-arid and desert areas of Africa (Dolensek and Bruning, 1978, Griner, 1983). Since ancient times, ostriches have aroused people's interest. Apart from being hunted for their flesh and plumes, ostriches were kept in captivity, tamed and semi-domesticated by the early Egyptians, Greeks and Romans. Egyptians and Roman women of noble birth rode ostriches on ceremonial occasions (Shanawany, 1991). Successful ostrich farming is largely dependent on the ability of farmers to rear sufficient numbers of viable and healthy chicks, however, high mortality of ostrich chicks , particularly during the first few months of life is a problem around the world (O'Brien, 2008). Despite fairly intensive care, high levels of mortality are often reported for young ostriches under commercial conditions the successful rearing of ostrich chicks under commercial semi-intensive and intensive farming conditions is therefore regarded as a challenge (Smith, 1993).

Smith *et al*. (1995) reported that ostrich chicks' mortality up to 3 months of age is 50.0% in South Africa. In the same vein, More (1996) also reported that average mortality for Ostrich chicks at 4 months was 37.0% in Queensland, Australia. The first 10 days to 3 months of age are by far the most critical period of the chick live and chick diseases can be avoided by keeping them at the prescribed temperature, provide a well-balanced ration with good management so that they can eat greedily by 10 days of age and thus increase their chances of survival to three months of age and older (Van Nickerk, 1996). Cogburn (2006) reported that chick livability is only 10% heritable, therefore the environment plays the largest role than genetics. Probably the biggest mortality of ostrich chicks is due to stress and great care should be taken to avoid any unnecessary stress due to heat, wind and over-handling (Elobeid *et al*. *2014*). The first month of life is the most difficult period for ostrich, therefore monitoring the health of the chick is important (Adewumi, 2008). Ostriches are susceptible to diseases found in avian species. Contact with wild birds or commercial poultry, environmental stresses including high stocking density and poor hygiene could cause infections (Shane and Tully, 1996). Ostrich chicks are susceptible to diseases and infections, various disorders and stress during the first few weeks of their life (Samson, 1997; Barri *et al*., 2005). Respiratory infections also occur in ostriches. It could be caused by viral and bacterial infections or confinement of birds for long periods with inappropriate ventilation (Stewart, 1994).

Although ostrich production and management is an emerging industry in Nigeria, low hatchability and poor chick survival are two primary factors constraining the industry as in other parts of the world (Cloete *et al*., 2002). The production of good quality chicks surviving to slaughter is essential for cost-efficient commercial production, as well as sufficient numbers of breeder replacement birds for selection in breeding programmes (More; 1996, Cloete *et al*., 2002). However, few studies have investigated aspects of ostrich chick survival (Cloete *et al.*, 2002 Wang *et al*). More systematic studies of chicks' survival would assist the industry in the development of adapted breeding and husbandry systems that could reduce stress imposed on chicks while enhancing the ability of ostrich chicks to cope with and resist the effects of stress (Wang, 2001).This study thus aimed at determining the survival rate of ostrich chicks in captivity.

MATERIALS AND METHODS

The study location

The research was carried out in the Teaching and Research farm, Osun State University, Ejigbo Campus, Ejigbo, Osun State, Nigeria. The climate of the experimental site is humid and it is located in the rain forest vegetation zone of Western Nigeria. The farm is located on latitude 7°54'N and longitude 4°18'E at an altitude 426m above sea level. The mean annual rainfall and temperature of the experimental unit are 1,200mm and 26.5°C respectively and having annual relative humidity averages of 25% and 20% ,rain and dry season respectively throughout the year. Ejigbo is located in the middle position of 35km to the North East of Iwo, 30km from Ogbomoso in the North and about 24km East of Ede. Usually the rainy season lasts from April to October.

Management of hatchlings

Fifteen hatchlings purchased at the Veterinary Research Institute, Vom, near Jos, Plateau State were brooded. The ostriches were reared in a brooders house, maintained at 40 °C and 25% relative humidity for two weeks, reduced to 30 °C for the following two weeks, thereafter they were kept at room temperature. Anti–stress and antibiotics were administered after their arrival respectively. The birds were raised under intensive housing system.in deep litter. All daily routine management practices were carried out like cleaning, provision of clean water, observation of sick birds, checking of mortality and appropriate record keeping of the birds. Routine vaccination regime was carried out as follows;

Day 1 Administration of NDV I/O in the hatchery
Day 5 Administration of B_1Hitchner
Day 14 Administration of 1st Losota through drinking water
Day 20 Booster dose of Lasota
Day 30 to 35 Probiotic administration (Keprogoa 500 g per ton) (Lactobacillus acidophilus)
Day 37 2nd Newcastle Disease Virus Vaccine

Experimental diet

The birds were fed ad-libitum intensively with a formulated Turkey starter diet containing 24.29% protein, 3200KCal/kg metabolized energy and 4% dietary fibre under intensive feeding system (Table 1). *Tridax procumbens* was also given as supplementary forage (Table 2). The study was carried out for six weeks.

Table 1: Composition of ostrich hatchlings' diet

Ingredients	Composition
Maize (g)	600.0
Soya bean (g)	200.0
Palm frond (g)	60.0
Fish meal (g)	100.0
Limestone (g)	10.6
Bone meal (g)	0.8
Fine salt (g)	0.3
Methionine (g)	2.0
Lysine (g)	2.5
Vitamin /Mineral Premix (g)	2.5
Protein %	24.29
Calcium %	1.15
Avail Phosphorus %	0.64
ME MJ per Kg	12.23

Table 2: Percentage composition of *Tridax procumbens*

Nutrients	Percentage (%)
Crude protein	21.1
Fat	1.5
Crude fibre	10.3
Ash	34.6
Moisture contents	32.6

Data collection and Analysis

The initial body weight of the bird was taken while subsequent body weights were recorded on weekly basis. The following formula was used:

$gr = W_e - W_b$

where, gr = weight gain or growth over a given period

W_b= Initial weight

W_e = Final weight

Weekly weight gain was determined by finding the different between the previous and current weight changes. While Feed Conversion Ratio was estimated as the ratio of feed intake per week and weight gain.

$$FCR = \frac{Feed\ intake}{weight\ gain}$$

Table 3: Progressive increase in weight (g) of ostrich hatchlings taken over a six weeks period

Parameters	Initial	Weekly weight gain (g per week)					
		1	2	3	4	5	6
Weight	414.85	476.42	818.92	1290.55	1883.59	2503.20	3493.27
Standard deviation	61.72	91.02	178.57	178.54	294.38	309.16	535.56
Mean weight gain	-	61.57	342.50	471.64	593.04	619.68	990.00
Standard deviation	-	46.43	103.29	102.54	193.75	167.30	284.75

The hatchlings were examined throughout the period of the study and mortalities were recorded. Inference was drawn based on the total state of wellbeing by visual assessment and Physical assessment. Data obtained were subjected to descriptive analysis

Results and Discussion

Table 4 shows the average weight of the chicks from the 1st week to the 6th week of the study. The body weight increased from 476.42g in the 1st week to 3493.27g in the 6th week. Thus, the rate of increment varied from 61.57g to 990.0g within the study period. The findings thus revealed that chicks showed progressive increase in weight throughout the duration of the experiment. The average weight gain per week was significantly high ($p>0.05$) (Fig. 1). The findings are consistent with those of Musa *et al.* (2005) who reported increased body weight gain in ostrich chicks. The weekly weight gain of ostrich chicks reported by Mushi *et al*. (1998) in Botswana was higher than the values obtained in this study.

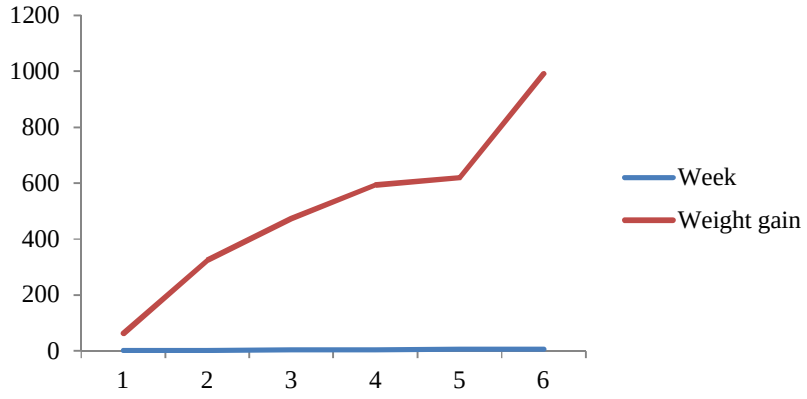

Fig. 1: Growth curve (g) of the ostrich chicks

Table 4: Growth performance of ostrich chicks

Parameters		Weekly weight gain (g per week)					
	Initial	1	2	3	4	5	6
Weight	414.85	476.42	818.92	1290.55	1883.59	2503.2	3493.27
Weight gain (g per week)	-	61.57	342.5	471.64	593.04	619.62	990
Dry matter intake (g per week)	-	200.00±3.53	550.00 ±2.82	540.00 ±2.82	520.20 ±5.65	505.21 ±5.09	490.00±9.19
Feed conversion ratio	-	3.24 ±0.98	1.61±0,06	1.14 ±0.08	0.87 ±0.07	0.81 ±0.02	0.49±0.12

Chick mortality and health related culling during the initial six weeks of age

Table 5 showed that 66.7% mortality was recorded within six weeks of age. The total loss amounting to ten out of fifteen hatched chicks. The mortality values in this study is however higher than 41.2% mortality reported by Musa *et al*. (2005). Health related culling by limb malfunction affected most of the birds. Agab *et al*. (2008) observed that the mean annual mortality rates for ostrich and emu chicks during the rearing phase were 29.1 and 21.6%, respectively while the mortality rate was 46.3% for the whole chick population during 4 production seasons (Agab *et al*., 2008).

The first symptoms of the limb malfunction appeared during the first week of the study, and not later than week two (2). The condition broke out abruptly and progressed Such that after a few days the legs were noticeably twisted at the tarsal joint and bent. The chicks affected were observed to limp, lose condition and prefer to lie down, the contorted leg making it impossible for them to move. All those efforts brought no desired effects because the chicks were unable to keep their balance when walking; they stumbled and fell down and finally died because of their inability to access their feed. These observations were also reported by Adewumi (2008) in studies on Emu hatchlings. Adewumi (2008) reported that the excessive body weight is regarded as the causative agent of leg deformation in emu.

Table 5: Mortality and health related culling in ostrich hatchlings during the six weeks rearing period

Item	Numbers	Percentage (%)
Dead chicks	8	53.33
Health related culling	2	13.33
Survivors	5	33.34
Hatchlings	15	100

CONCLUSION

The chick weight and weight gain during the six weeks of growth increased progressively. Chick mortality and health related culling during the six weeks of age resulting in the death of the chicks might occur as a result of environmental hazard, and managerial components that potentially may predispose chicks to disease. Low chick survivability of ostrich is one of the major factors impeding the success rate of ostrich husbandry. Therefore, further research should be conducted on how to encourage the survivability of ostrich in captivity.
References must be prepared according to the journal's style.

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