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Feeding Practices, Growth Rate and Management of Ostrich Chicks in Sudan

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Abstract: Seventeen male Ostrich chicks (*Ostruiothio*, *Camelus camelus*) aged one month old were brought from Radom National Park to the research farm of University of Nyala, both in Sudan, and reared indoor, concentrate rations were formulated and provided *ad-libitum* and water equally supplied. During the study period, chick behaviour were observed, body weight gained (g/day), feed intake (g/day), water consumption (liter/day) and feed conversion ratio (FCR) were found to be 178.64, 447.91, 4.18 and 2.39, respectively. Rapid growth rate during the age of 2 to 4 months resulted to leg deformation which eventually leads to the death of some chicks with mortality rate 41.20% at the end of the experiment. The body measurements at different ages of chicks were highly significant ($P < 0.05$). There were high positive correlations between live weight and other parameters estimated (shank diameter and length, nick diameter and length, wing length, body length, heart girth and bird high).

Key words: Ostrich chicks, feeding practices, Sudan, nutritional requirements

Introduction

Wildlife has changeable dynamic importance according to human situation and his needs. Previous studies carried out by Babiker and Mohamed (1988) indicated that wildlife can survive and produce under adverse climatic conditions, yet accurate statistics of total population of species inhabiting Sudan are lacking. Sudan has a large number of Ostrich populations in its natural environment. Studies by Ciliers and Huchzermeyer (1998) and Tully and Shane (1996) indicated that Ostrich farming has spread worldwide and fully established in South Africa. Studies by Ciliers and Huchzermeyer (1998) characterized Ostrich by low-fat and low-cholesterol meat to be the primary product. There is also a market for leather, feather and oil by-products derived from Ostrich production.

Experiments conducted on Ostrich so far have been very scanty in literature and available evidences mainly focused on nutritional requirements of Ostrich and it was suggested that the turkey is the best avian model from which to predict Ostrich nutrient needs (Ullrey and Allen, 1996).

Also, knowledge on various nutritional aspects is not well defined Ciliers and Huchzermeyer (1998). Ostrich in different regions showed different development of body weight and high concentrate feed intake resulted to rapid growth during age of four months (More, 1996). The purpose of this study was to evaluate some characteristics of Ostrich chicks in Southern Darfur, Sudan, particularly the husbandry and the feeding practices.

Table 1: Concentrate rations (%DM) and composition for Ostrich chicks in Western Sudan

| Stuffs | (%DM) |
|----------------------|--------|
| Ingredients | |
| Sorghum | 61.00 |
| Ground nut cake | 18.00 |
| Ground nut husk | 14.00 |
| Fish meal | 5.00 |
| Oyster shell | 1.80 |
| Salt | 0.20 |
| Total | 100.00 |
| Chemical composition | |
| Dry matter (DM) | 92.40 |
| Ash | 14.50 |
| Crude protein (CP) | 20.20 |
| Ether extract (EE) | 3.60 |
| Crude fibre (CF) | 7.40 |

Materials and Methods

Housing: This experiment was conducted at University of Nyala research farm, Sudan, between February to August, 1999. Two pens each with dimensions of 4x4x2.4-m shaded with a door of 200x90-cm and three windows 125x180-cm made up of fine wire net were used. The floor of the pen was covered with ravel and sawdust. Each pen was supplied with two feeding and three water troughs made up of zinc and plastic, respectively.

Source of animals: Seventeen Ostrich chicks aged one month were brought from Radom National Park, Sudan,

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Table 2: Means and standard deviation for different parameters of Ostrich chicks

| Parameters | Age (weeks) | | | | |
|---------------------|-------------|------------|------------|------------|-------------|
| | 1 | 3 | 6 | 9 | 12 |
| Live weight (kg) | 2.71±0.50 | 5.52±1.59 | 9.72±2.12 | 14.50±3.05 | 20.08±4.49 |
| Shank diameter (cm) | 4.91±0.31 | 6.13±0.10 | 7.58±0.61 | 8.61±0.25 | 10.28±0.34 |
| Shank length (cm) | 12.53±0.59 | 16.83±1.13 | 25.20±1.38 | 30.50±1.11 | 35.22±1.22 |
| Neck diameter (cm) | 10.28±0.79 | 14.85±0.82 | 18.85±1.30 | 20.78±1.12 | 25.15±1.42 |
| Neck length (cm) | 22.10±2.03 | 31.78±3.25 | 49.75±4.17 | 62.58±3.04 | 71.53±1.72 |
| Wing length (cm) | 15.15±0.86 | 22.72±2.56 | 34.90±2.87 | 44.67±3.00 | 49.93±2.91 |
| Body length (cm) | 16.50±2.10 | 22.66±1.30 | 31.53±2.76 | 38.02±2.43 | 46.58±3.92 |
| Heart girth (cm) | 10.60±1.21 | 15.69±1.89 | 19.54±1.49 | 23.90±2.60 | 29.60±1.31 |
| Bird high (cm) | 28.40±3.05 | 48.20±3.94 | 67.70±3.02 | 83.95±3.78 | 107.59±3.87 |

Table 3: Correlation coefficient of body weight and body measurements of Ostrich chicks

| Parameters | Live weight | Shank diameter | Shank length | Neck diameter | Neck length | Wing length | Body length | Heart girth | Bird high |
|----------------|-------------|----------------|--------------|---------------|-------------|-------------|-------------|-------------|-----------|
| Live weight | 1.000 | | | | | | | | |
| Shank diameter | 0.993** | 1.000 | | | | | | | |
| Shank length | 0.982** | 0.992** | 1.000 | | | | | | |
| Neck diameter | 0.975** | 0.995** | 0.987** | 1.000 | | | | | |
| Neck length | 0.980** | 0.990** | 1.000** | 0.984** | 1.000 | | | | |
| Wing length | 0.976** | 0.987** | 0.998** | 0.982** | 0.999** | 1.000 | | | |
| Body length | 0.992** | 0.999** | 0.996** | 0.992** | 0.994** | 0.991** | 1.000 | | |
| Heart girth | 0.991** | 0.998** | 0.987** | 0.993** | 0.985** | 0.983** | 0.996** | 1.000 | |
| Bird high | 0.991** | 1.000** | 0.991** | 0.995** | 0.989** | 0.987** | 0.999** | 0.999** | 1.000** |

Correlation is significant at the 0.01 level (2-tailed).

divided into two groups, identified by shank tag. The initial weight of each Ostrich was taken; daily feed and water intake were recorded. Chopped alfa-alfa, gravel, vitamins and minerals were provided three times a week. The chicks were not vaccinated throughout the experimental periods.

Feeding: Vitamin B complex and Vitamin C were injected intramuscularly into the Ostrich chicks and the concentrate mash ration formulated, supplied to the chicks and its chemical composition is presented in (Table 1).

Experimental measurements: Daily records of total amount of feed and volume of water consumed were kept and other parameters recorded fortnightly. Weight of chicks were carried out using spring balance and shank diameter taken from the mid, shank length taken from hook joint to meta-carpopharyngeal joint, neck diameter taken from around its base, neck length taken from last cervical vertebrae to posterior end of the atlas, wing length taken from caroid to great trochanter of femur, heart girth behind wings and bird height taken from claws to dorsal of the thorax, Data collected were analyzed using one-way analysis of variance (ANOVA) and correlation coefficient using SPSS 11.5, respectively.

Results

The study revealed that pens with these dimensions are suitable for Ostrich chicks at two months old, after that age dimensions need to be added and spaces to run round are necessary. Feed and water troughs should be adequate and evenly distributed to avoid injury with sharp edges of metallic one. Chicks behaviour like body temperature regulation, scratching the ground and backing feed trough were observed. At third month of age, chicks clustered to flapping their feathers, wings moved forward and lateral, there were pecking and social vices among the birds.

Average feed intake, water consumption per liter, daily weight gained and feed conversion ratio (FCR) were estimated and were as depicted in Fig. 1, 2, 3 and 4, respectively. High concentrate feed intake increase growth rate during the age of 2 to 4 months causing leg deformities in the hook joint resulting in death among the birds with mortality rate up to 41.20% at 45 days old, fowl-pox like lesions was also observed, but disappeared a week later, there were no other diseases observed.

Table 2, showed the mean and standard deviation for body measurements at different ages of chicks, highly significant difference ($P < 0.05$) was found among body measurements and age of chicks. Similarly, there was

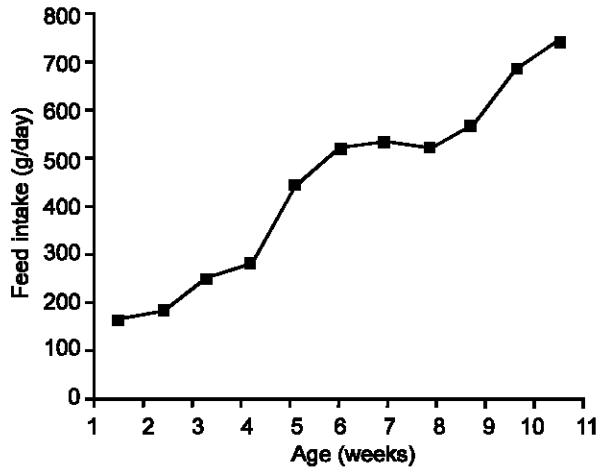


Fig. 1: Feed intake of Ostrich Chicks (g/day)

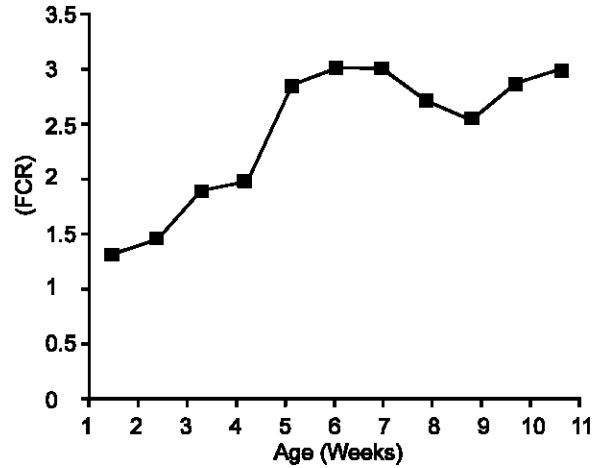


Fig. 4: Feed conversion ratio of Ostrich chicks (FCR)

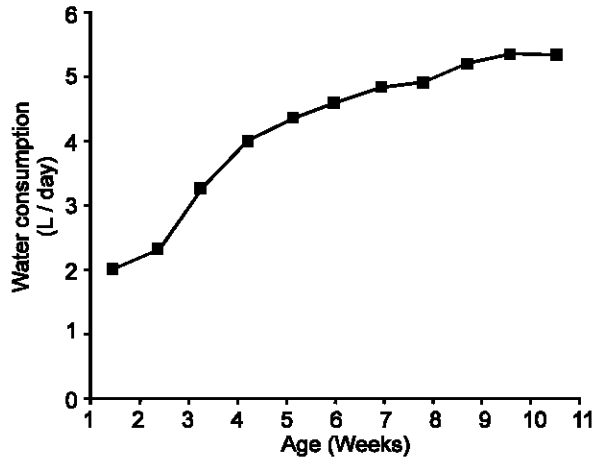


Fig. 2: Water consumption of Ostrich chicks (L/day)

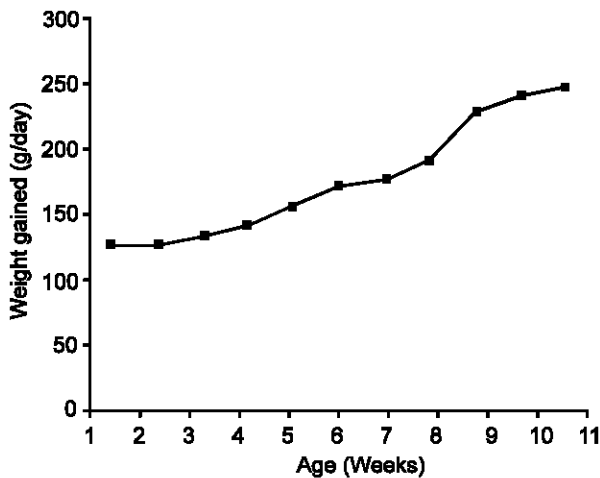


Fig. 3: Weight gained of ostrich chicks (gram/day)

positive correlation between live weight and (shank diameter and length, nick diameter and length, wing length, body length, heart girth and bird high) (Table 3).

Discussion

The dimensions of pen in this experiment were convenient for chicks at 2 months old. Thereafter extra space can be added as previously reported by (Kreibich and Sommer, 1995). Metal trough can change to plastic to avoid injury and bleeding which resulted in pecking and cannibalism. Chicks behaviour observed in this study were same as observed by (Kreibich and Sommer, 1995).

Average feed intake per day, water consumption per day, feed conversion ratio (FCR) and weight gained as shown in the accompanied Fig. 1, 2, 3 and 4 were not different from that estimated by (Mushi *et al.*, 1998). Also, Kreibich and Sommer (1995) explained that feed conversion ranged from 1.4:1 to 1.6:1 for younger birds 4 to 6 months old, while for older birds ranging from 4:1 to 6:1.

The high concentrate feed intake increased weight gained during 2 to 4 months and absence of space to run around caused 41.20% mortality, 35.30% dead by leg deformation and 5.90 % were injury by sharp edges of metal trough. This information was in agreements with (Kreibich and Sommer, 1995 and More, 1996). Body measurements were found highly significant among chicks age. The observations of the present study for body measurements (shank diameter and length, nick diameter and length, wing length, body length, heart girth and bird high) is similar to previous studies carried out by Mushi *et al.* (1998) indicated that metatarsal length increased rapidly at weekly rate of 2.50-cm and that body weight was highly correlated with metatarsal length 0.90 and the mean body length reached 134-cm in 4 months.

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