Effect of Commercial & Natural Feeds on the Growth Performance of Ostrich (Struthio camelus) in Captivity

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Abstract

In Pakistan, ostrich farming is becoming more popular as a means of obtaining inexpensive meat that is also devoid of cholesterol and other diseases when compared to chicken. In the wild, ostriches dwell in flocks of five to fifty and perform well in captivity. Ostrich chicks' early development rate is critical in preparing the bird for later growth up till the slaughter mass. The original egg mass from which the bird emerges determines the hatching weight. Ostrich chicks lose up to 20% of their weight in the first five to seven days after hatching. The typical carcass weight of an ostrich might be 57-58 percent of the live body weight. On a monthly basis, weight and height were determined, and given feed was calculated on a daily basis. The variation in growth rates between the two farms is due to the fact that the Balouch ostrich farm has far better conditions for birds and provides more food, whilst the Hamayoon ostrich farm has a lower growth rate due to restricted food availability. Furthermore, the death rate is linked to a lack of food.

Keyword: Ostrich, Chicks, Hamayoun Ostrich, Commercial feed, Natural feed.

1. Introduction

The ostrich is classified as a monogastric herbivore capable of consuming large amounts of nutritional fodder. Ostriches have a large true stomach (proventriculus) and gizzard, which allow them to store a lot of food. Ostriches have a very short small intestine and a fairly lengthy intestine. Ostriches also possess relatively small ceca (Cooper and Mahroze, 2004; Aganga et al., 2003; Jongbloed, 1998; Swart et al., 1993). In the wild, ostriches dwell in flocks of five to fifty and may thrive in captivity (Donegan, 2002). The early development rate of ostrich chicks is essential in preparing the bird for subsequent growth up to slaughter mass. The hatching mass is determined by the initial egg weight from which the bird hatches. Within five to seven days of hatch, ostrich chicks lose up to 20% of their weight (Deeming, 1999). When ostriches are fed on a grazing system, their development peaks between 120 and 180 days of age, and after 10 to 11 months of age, their growth slows dramatically (Champion and Weatherley, 2000). The weight of ostrich chicks on day ten of life was associated with their development rates in captivity, the researchers came to the conclusion that environmental factors appeared to regulate ostrich development. The genotype has a major influence on the amount of ostrich meat produced (Deeming and Ayres, 1994). The typical ostrich carcass weight is 57-58 percent of the live body weight of a 100-130 kg bird, with more than 62 percent lean meat and 9% fat. The leg and thigh muscles account for 41.4 percent of the lean component of the ostrich carcass, and
sex seemed to have little influence on carcass composition or muscle color (Morris et al., 1995). The entire pelvic muscle mass of a 105 kg live weight ostrich was determined to be 33.7±2.1 percent of its body mass, equivalent to a unilateral mean pelvic limb muscle mass of 16.97±1.08kg (Smith et al., 2006). Egg, meat, and skin are the three major economic assets of the ostrich. Ostrich eggs are seldom consumed in large quantities by humans since they are considered a luxury item. Despite its great nutritional content, it is mostly utilized for hatching chicks (Kokoszynski, 2017). Raw meat, steak, dry products, and hamburger meat are the most common types of meat produced (Al-Nasser et al., 2003).

The importance of ostrich is that it can be used instead of cattle as a source of red meat. Furthermore, because of its low fat and cholesterol level (Poawska et al., 2011) and high polyunsaturated fatty acid content, ostrich meat is an excellent choice for a healthy diet (Paleari et al., 1998). Skin is commonly utilized in the creation of clothing, accessories, and jewelry. The Struthio Camelus species has several subspecies, including South African Black Necks (Struthio camelus domesticus), Blue Necks (Struthio camelus australis, Struthio camelus molybdophanes) and Red Necks (Struthio camelus camelus, Struthio camelus massaicus) which laid the foundation of the ostrich industry and were the result of an artificial cross between Struthio camelus australis and Struthio camelus camelus (Engelbrecht, 2013). In 14 January 2012 ostrich were declared as livestock in Pakistan. After this the forming of ostrich is started in Pakistan. Basically, our aim of study is determining to the food conversion ratio of ostrich in the captivity and also, we note the effect of medicine on ostrich health and growth. We also notice the mortality of ostrich in captivity.

2. Material and Methods

We selected two farm houses named as:

1; Balouch Ostrich farm Samma Satta
2; Hamayoon Ostrich farm Moza Abbas pur Tehsil Ahmad Pur East District Bahawalpur

Balouch Ostrich farm is located near Bahawalpur city on Rahimyar Khan Road at the distance of 15 km away from Islamia University Bahawalpur. Hamayoon Ostrich farm Moza Abbas pur Tehsil Ahmad Pur East District Bahawalpur was located about 65 Km away from Islamia University Bahawalpur. Two different types of food were given to birds, one type of food was poultry prepared feed and second type is the natural food Lossin, barseem (Pennisetum clandestinum) and jawar (Sorghum bicolor). The living conditions for the birds were observed which were variable at both farms. Overall better conditions of cleanliness, water availability and shedding were observed at Balouch Ostrich farm as compared to the Humayoon Ostrich Farm. The birds were supplied with gravel and salt pots to maintain their calcium and salt levels better at Balouch farm house while Humayoon farm was missing such facilities. Research data was collected on daily and monthly basis for food utilization and the growth rate of each bird at both farm houses. The age of chicks at both farms were same at the start of research. Weight and height were calculated on monthly basis while feed was observed on daily basis. Data was collected on prescribed data sheets. Feed of both natural and commercial types were calculated by using digital balance. Height was calculated by using metallic measuring tape while weight of the bird was calculated by using digital balance especially prepared for these birds.

3. Results

On Balouch Ostrich farm, 50 birds were studied for 6 months from February, 2017 to July, 2017. To evaluate growth rate in relation to food available. At this farm, excessive food of both types (natural and commercially prepared) was supplied. Results showed that in February, 2017 average weight of a bird was 20kg which continuously increased till the last month of study (July, 2017) and became on average 70kg/bird. The maximum (17kg) increase in weight was observed in the month of May which
show direct relation to maximum usage of food in the same month. While height was increased from 3 feet to 8.3 feet from February to July, 2017 and maximum (1.3 feet) height was increased in the month of June when the age of bird was 8 months (Table No 1).

**Table No 1:** Relationship between food and growth in Ostrich (*Struthio camelus*) at Balouch Ostrich Farm

| Study month | Total No of birds | Avg. wt./bird (Kg) | Avg. height/bird (feet) | Avg. Commercial food/bird/day (Kg) | Avg. Natural food/bird/day (Kg) | Total food/bird/day (Kg) | Net increase of height/bird (Feet) | Net wt. gain/bird/month (Kg) |
|-------------|-------------------|---------------------|-------------------------|---------------------------------|-------------------------------|--------------------------|-------------------------------------|-------------------------------|
| February    | 26                | 23                  | 3                       | 1.14                            | 3.40                          | 4.54                     | -                                   | -                             |
| March       | 26                | 30                  | 3.2                     | 1.14                            | 3.84                          | 4.98                     | 0.2                                 | 7                             |
| April       | 26                | 35                  | 3.6                     | 1.22                            | 3.84                          | 5.06                     | 0.4                                 | 5                             |
| May         | 22                | 50                  | 4.5                     | 1.44                            | 4.54                          | 5.98                     | 0.9                                 | 15                            |
| June        | 20                | 45                  | 5.2                     | 1.50                            | 1                             | 2.50                     | 0.7                                 | -5                            |
| July        | 20                | 40                  | 6.5                     | 1.50                            | 1                             | 2.50                     | 1.3                                 | -5                            |

On Hamayoon Ostrich farm, there was limited supply of food and bird growth was also reduced. At this farm total 26 chicks of 90 days age were brought together out of which 6 were died due to poor food supply and mud eating. Here the chicks gain maximum height from 3 feet in February, 2017 to maximum 6.5 feet in the month of July, 2017. That show about 1.8 feet less height with same age chick group of Balouch Ostrich farm. Similarly, the weight gain was observed from 23 Kg/bird in February, 2017 to maximum 40 kg/bird in the month of July, 2017. Which show about 30 kg/bird less weight gain as compared to the Balouch Farm house that was a significant difference observed. Maximum height increase was observed in the month of July while the birds lose their weight (5kg in each month) in the months of June and July instead of increase in weight (Table No 2)

**Table No 2:** Relationship between food and growth in Ostrich (*Struthio camelus*) at Hamayoon Ostrich Farm, Ahmad Pur East

| Study month | Total No of birds | Avg. wt./bird (Kg) | Avg. height/bird (feet) | Avg. Commercial food/bird/day (Kg) | Avg. Natural food/bird/day (Kg) | Total food/bird/day (Kg) | Net increase of height/bird (Feet) | Net wt. gain/bird/month (Kg) |
|-------------|-------------------|---------------------|-------------------------|---------------------------------|-------------------------------|--------------------------|-------------------------------------|-------------------------------|
| February    | 50                | 20                  | 3                       | 1.2                             | 2                             | 3.2                      | -                                   | -                             |
| March       | 50                | 32                  | 4                       | 1.28                            | 2.72                          | 4                        | 1                                   | 12                            |
| April       | 50                | 45                  | 5.1                     | 1.8                             | 3.6                           | 5.4                      | 1.1                                 | 13                            |
| May         | 50                | 62                  | 6.2                     | 2.8                             | 4.8                           | 7.6                      | 1.1                                 | 17                            |
| June        | 50                | 65                  | 7.5                     | 2.4                             | 3.2                           | 5.6                      | 1.3                                 | 3                             |
| July        | 50                | 70                  | 8.3                     | 2                               | 1.6                           | 3.6                      | 0.8                                 | 5                             |
Results from Balouch Ostrich farm Samma Satta showed that minimum (0.8 feet) height gain was observed in the month of July in the age of 9 months while continuous increase of 1 foot to 1.3 feet was observed from 3rd month to 8th month of age (February to June). Similarly, continuous increase in weight was observed from 4th to 7th month of age i.e. March, April and May, 2017 as 12Kg, 13Kg and 17Kg respectively. While on average minimum weight was gained by each bird in the month of June and July, 2017 as 3Kg and 5Kg respectively. But the maximum height gain was noticed in the month of June, 2017, which was on average as 1.3 feet per bird (Figure No 1).

![Figure 1: Showing average increase in height and weight of birds on monthly basis at Balouch Ostrich Farm at Samma Satta](image)

Results observed at Hamayoon Ostrich Farm, Ahmad Pur East showed that increase in weight was continuous during March, April and May as average increase per bird was calculated 7kg, 5kg and 15kg respectively while weight loss was observed in the month of June and July (5kg in each month). But the increase in height was maximum observed in the month of July that was 1.3 feet per bird (Figure. no 2).

![Figure 2: Showing average increase in height and weight of birds on monthly basis at Hamayoon Ostrich farm Ahmad Pur](image)
4. Discussion

Ostrich farming is emerging business in Pakistan to obtain cheap meat which is also free of cholesterol and other infections as compared to poultry. Similar results were reported by Warale et al., 2014 who said that Ostrich farming is done for meat which is of high quality in terms of low fat, cholesterol and gamey flavor which renamed it as “new heart healthy”. Their fat is rendered to produce oil, which is white in color and signifies dietary, therapeutic (anti-inflammatory) and cosmetic value, while leathers is used for boots, belts, luggage, and accessory items. Fact from our studies shows that the FCR of ostriches are much more than any other birds and it is also revealed that at the early age the growth of chicks is much more which gradually slow down and the growth rate is directly relate to food availability to the ostrich chicks under captivity. In our result, it is cleared that the growth rate is increase slowly at the age of 4th,5th month of chicks and it is increased much more at the age of 6th,7th month of chicks during April and May 2017 and height increased throughout the age till the last month of our study at the age of 9th month of chick. But at the age of 8th, 9th month the growth rate of ostrich decreased. Similar results were observed by Farrell, 1997 who reported that the ostrich growth curve from South Africa which showed that the at the early age of ostrich from 3rd month to 7th month of chicks and after this age the growth of bird’s slowdown.Similarly, Degen et al., 1991 found that when ostrich chicks weighed 4080 g, they lost 7.6 g/day in the first 6 days, gained 43.4 g/day between 6-14 days, 114 g/day between 14-21 days, and 145 g/day between 21-35 days. Between 70 and 98 days, the highest average daily increase was 455 grams.Results of Angel's 1996 findings in Indiana between October 1993 and January 1994 were likewise similar to ours. When given a meal comprising 22 percent protein, 18.6 percent NDF, 6.9 percent fiber, 3.2 percent fat, 1.6 percent calcium, 0.8 percent accessible phosphorus, and a chick ME estimated at 10 MJ/kg, ostriches reached a body weight of 29.6 kg at 90 days of age. Feed conversion rates (FCR) for ostriches are greater than other poultry species during early development, according to Smith et al., (2006). According to Cilliers (1995), ostriches should have the following FCRs: from hatching to two-month age 2:1, from 2 - 4 months FCR should be 2:1, from 4 - 6 months 3.8:1,from 6 - 10-month age 5.5:1,from 10 - 14 month of age it should be 10:1. The FCR will vary depending on the feed sources and how well the diet matches the needs. The FCR may be 2:1 in the early phases of growth, but when the body weight reaches around 70 kg, it drops to 5:1. (Farrell, 1997). In birds older than ten months, the FCR is close to 10:1.

5. Conclusion

When we compared the results of both farms it is cleared that the growth rate has direct relation to the food availability. The weight gain increase in both farms from the age of 3rd month at the February to the age of 7th month at the June. The height gain also increases from the age of 3rd month of chicks to the age of 9th months. The difference in the growth rate of both farm is due to that the Balouch ostrich farm has much better condition for birds and they provided the abundant food supply while in the Hamayoon ostrich farm the growth rate is relatively less due to limited food supply. Moreover, the mortality rate is also related to poor food availability.

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