Journal of Animal and Veterinary Advances 6 (5): 676-677, 2007

Physical Characteristics of Ostrich *(Sruthio camelus)* Eggs from Botswana

[1]E.Z. Mushi, [1]J.W. Isa, [2]M.G. Binta and [1]M.C.G. Kgotlhane
[1]Botswana College of Agriculture, Private Bag 0027 Gaborone, Botswana
[2]Laboratory of National Veterinary, Private Bag 0035 Gaborone, Botswana

Abstract: A study was undertaken to investigate the physical characteristics of eggs of farmed ostriches. A total of 75 eggs were measured for weight, length, width, shell thickness at lesser curvature, middle curvature and greater curvature. The mean weight was 1321±219 g. The mean length and width were 15.77±1.09 and 12.88±0.97 cm, respectively. The mean shell thickness at lesser curvature was 1.67±0.18 mm, at middle curvature 1.65±0.16 mm and at greater curvature 1.64±0.14 mm. There was no significant difference between the findings in this study as compared to those of ostrich eggs from other countries.

Key words: Ostrich eggs, dimensional characteristics, curvature, birds, Botswana

INTRODUCTION

The ostrich (*Struthio camelus)* is the world's largest living bird belonging to the order of birds known as Ratitae or running birds. As the world largest bird, the ostrich lays the largest egg of any living bird. The average ostrich egg weighs approximately one kilogram and is equivalent to 24 fowl eggs (Erasmus and Erasmus, 1995). They are 15cm long and 13 cm wide.

The extremely strong shells of ostrich eggs make them very resistant to breakage during handling and transportation while also serving as a basis for the making of curios. The contents of ostrich eggs are similar to that of other species in terms of the proportion of main components and chemical composition (Keffen and Jarvis, 1984). In color the ostrich egg may vary from white to yellowish white. It is pitted with superficial pores of various shapes and sizes. The female starts to lay fertile eggs shortly after mating and eggs are laid in clutches of 24-40 eggs. The hen stops laying for a period of 7-10 days, after which starts a new clutch (Hallam, 1992). High producing females may lay between 80-100 eggs during a breeding season (Keffen and Jarvis, 1984).

Eggs are divided into different shapes of ovoid, spherical, elliptical, biconical or conical. The yellowish white eggs tend to be very large and they are ovoid more than a hen's egg. The ostrich and hen eggs tend be elliptical (Batty, 1994).

Successful ostrich farming depends on the strong healthy and viable eggs. Productive performance such as fertility and hatchability are very variable (Deeming,1995). Intermediate-sized eggs hatch better than small or large ones. At present there is lack of information on the physical characteristics of farmed ostrich eggs in Botswana. This study was undertaken to document the physical features such as weight, length, width and shell thickness of farmed ostrich eggs in Botswana.

MATERIALS AND METHODS

The eggs were from an ostrich farm in Lobatse district of south eastern Botswana. Ostriches kept consisted of Blue Neck, African Black and their crosses. The breeding ostriches were kept in camps in a ratio of 1:2 for males: females. Breeders were fed 2 kg ostrich breeder mash per day composed of 15.4% Crude protein (cotton seed cake), 12% Crude fibre, 4% crude fat (ether extract) and some minerals provided for *Ad libitum* consumption. Ostrich eggs were collected twice a day in the morning and afternoon. Eggs were fumigated with a mixture of potassium permanganate and formaldehyde and incubated at 36°C at a Relative Humidity (RH) of 75% for 39 days and transferred to a hatcher set at a temperature of 35°C and RH of 65%.

A sample of 75 eggs which had failed to develop or hatch were collected from the farm and brought to the laboratory at the Botswana College of Agriculture. The eggs were weighed using a digital computing weighing scale (Teraoka Weigh System PTY, Ltd) with an accuracy of 0.1 g. Linear measurements were made using a 30 cm vernier calipers. Egg shell thickness was measured at three points on the egg at the greater and lesser curvatures and at the center. This was done after the shell had been cracked o create a window about 10 cm in diameter over the lesser convex area of the shell and the shell membrane peeled off.

Corresponding Author: E.Z. Mushi, Botswana College of Agriculture, Private Bag 0027 Gaborone, Botswana

Table 1: Some measurements on farmed ostrich eggs

	Number	Mean	Standard deviation	Range
Length, mm	75	15.77	1.09	13.2-19.3
Width, mm	75	12.88	0.97	11.3-15.5
Lesser curvature, mm	75	1.68	0.18	1.3-2.0
Greater curvature, mm	75	1.65	0.16	1.3-2.0
Middle curvature, mm	75	1.64	0.14	1.3-2.0
Weight, g	75	1321.00	219.4	1111-1696

RESULTS

The mean length and width of 75 ostrich eggs were 15.77±1.09 cm with a range of 13.2-19.3 and 12.88±0.97 cm with a range of 11.3-15.5 cm, respectively (Table 1). The shell thickness at the greater curvature was 1.65±0.16 mm, at middle curvature 1.64±0.14 mm and at lesser curvature 1.68±0.18 mm. The mean weight was 1321.0±219.4 g.

The following correlations, length with lesser curvature, lesser curvature with middle curvature, lesser curvature with weight, greater curvature and weight were highly significant ($p<0.01$).

DISCUSSION

The egg dimension of domesticated ostriches in Lobatse, Botswana showed an average length and width of 15.77 and 12.88 cm, respectively. They compared very well with recorded average values of a length of 15 cm and width of 13 cm (Batty, 1994; Hallam, 1992).

The mean shell thickness at the greater curvature was 1.65 and 1.64 mm at the middle curvature whereas (Keffen and Jarvis, 1984) in Zimbabwe reported mean measurements of 1.84 mm at the greater and 1.82 mm at the middle curvature. It would appear that measurements of shell thickness were good enough to reduce breakages during egg collection, transportation and incubation.

The mean weight of incubated eggs in this study was 1321.0 g whereas (Batty, 1994) reported a mean weight of 1400.0 g for eggs which hatched. A heavier mean weight of 1406.3 was recorded (Keffen and Jarvis, 1984). Foggin (1992) obtained a mean weight of 1250 g of all eggs incubated and a mean weight of 1400 g for eggs that hatched. Hoyt *et al.* (1978) recorded a mean weight of 1500 g for all eggs. Eggs that weighed less than 1000 g or heavier than 1800 g were likely to have reduced hatchabiliy. It would seem that eggs in the present study were within the normal range of eggs with good hatchabiliy.

CONCLUSION

In conclusion, the mean weight of incubated eggs in this study were higher than those recorded by Foggin (1992) and lower than that reported by Hoyt *et al.* (1978) and Superchi *et al.* (2002).

REFERENCES

Batty, J., 1994. Ostrich Farming. The Bindery Sawmill Buildings, Stedham, Midhurst West Sussex, pp: 91.

Deeming, D.C., 1995. Factors affecting hatchability during commercial incubation of ostrich (*Struthio camelus)* eggs. Br. Poult. Sci., 36: 119-159.

Erasmus, E., V. De and J. Erasmus, 1995. Ostrich Odyssey, Featherfarm, pp: 37.

Foggin, 1992. Veterinary problems in ostriches. In: The TOPAZ Introduction to practical ostrich farming. The Ostrich Producers. Association of Zimbabwe, Harare, Zimbabwe, pp: 61-96.

Hallam, M.G., 1992. The TOPAZ Introduction to practical ostrich farming. The Ostrich Producers Association of Zimbabwe, Harare, Zimbabwe, pp: 19.

Hoyt, D.F., 1978. Adaptation of avian egg to incubation period. Anim. Zool., 20: 417-425.

Keffen, R.H. and J.F. Jarvis, 1984. Some measurements relating to ostrich eggs. Ostrich, 55: 182-187.

Superchi, P., C. Sussi, A. Sabbioni and V. Beretti, 2002. Italian ostrich (*Struthio camelus)* eggs: Physical Characteristics and Chemical Composition. Ann. Fac. Vet. Di Pharma, 22: 155-162.