

## Some breeding data on Somali ostrich

On 30th June, 1969, while engaged in research work in Tsavo National Park (East), I happened to find a nest of Somali ostrich (*Struthio camelus molybdophanes* Reichw.) in the area between Irina Hill and the main Nairobi-Mombasa road. A female was sitting on the nest which contained 21 eggs. As she rose and walked away, she gave the impression of being in some pain, suggesting that she might have been about to lay another egg. On 2nd July there were 22 eggs, more or less confirming this suggestion. This was the final clutch size; a male was incubating. Walking off, he started a striking display, drooping his wings to near the ground and rocking from side to side while running slowly. This was later observed repeatedly and is likely to be a display "intended to" attract the attention of a potential predator and to lure him away from the nest. The female was never seen to perform this display near the nest, but later on she showed it once when accompanying the young. Observations on subsequent visits to the nest, including the period of hatching, are summarized in Table 1.

On the last visit (15.8.69), no ostrich were seen near the nest, which appeared to have been raided by a predator, as the dead young had disappeared; also, two of the remaining four eggs had been destroyed.

On 26th and 30th August, the family was seen 1-2 km from the nest site with 15 young, indicating that another one of those actually hatched had perished in the meantime. In September, no observations could be made. On 1st and 2nd October, a pair of ostrich and five young (most likely the same family) were seen in the same area, indicating a high mortality among the chicks. The mortality may have been higher than it would be normally, as the ostrich family lived near an important tourist road and may have been disturbed frequently.

Only one female was ever seen near the nest or with young, but it remains unknown whether the entire clutch of 22 eggs was produced by one female alone.

The incubation period, calculated from the date the last egg was laid (30.6.69) to the date the last young hatched (13.8.69), was 44 d, which agrees well with data given in the literature for ostrich in general (e.g. 40-42 d by Makatsch, 1954). However,

incubation is said to begin before completion of the clutch; this could not be ascertained in the present case.

Hatching was spread over 4 d, as evident from Table 1. Hatching success was about

TABLE 1  
Development of ostrich brood

Date	Time	Parent on nest	No. of eggs intact	No. of eggs broken	No. of young
24.7.69	17.45	2	22	—	—
31.7.69	17.30	2	22	—	—
8.8.69	08.30	2	22	—	—
9.8.69	08.30	2	22	—	—
10.8.69	08.30	2	16	2	4
10.8.69	16.30	2	13	3	6
11.8.69	08.15	2	11	2	9
11.8.69	17.00	2	11	1	10
12.8.69	14.30	2	7	2	13
13.8.69	14.30	2	4	—	18
14.8.69	09.30	3 + 2	4	—	18 <sup>1</sup>
15.8.69	16.30	—	2	—	—

<sup>1</sup> one young dead in nest, one apparently dying; parents both standing near nest, none sitting

82%. Of the four eggs remaining in the nest on 14.8.69, two were destroyed by a predator during the following night, before they could be examined. The other two eggs were collected; one was unfertilized and the other had been fertilized but development had stopped at an early stage. These two eggs yielded the following measurements:

	A	B
Dimensions	168 × 135 mm	166 × 132 mm
Fresh weight	1,600 g	1,406 g
Weight of empty shell	341 g	317 g
Volume (approx.)	1,420 cc	1,365 cc

(The volume was determined by filling the empty shell with water and then pouring this into a measuring cylinder)

These eggs are considerably larger than the average of "about 145 × 120 mm" given by Mackworth-Praed and Grant (1957, p. 3) for the Somali ostrich; they are more like those of *S. c. massaicus* Neum. (160 × 140 mm, loc. cit.).

## References

- MACKWORTH-PRAED, C. W. and GRANT, C. H. B. (1957). Birds of Eastern and Northeastern Africa. 2nd ed. Longmans, Green & Co., London.
- MAKATSCH, W. (1954). Die Vögel der Erde. Duncker & Humblot, Berlin.
- Walter Leuthold, Tsavo Research Project, P.O. Box 14, Voi, Kenya.

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## Black rhinoceros vocalisations

Numerous black rhinoceros (*Diceros bicornis* (L.)) vocalisations have been mentioned in the literature in recent years. As described by various authors, these vocalisations vary considerably from "mews" and "squeaks" to "grunts", "squeals", "roars" and "puffing snorts".

One additional vocalisation was described by Ritchie (1963) as "like a man trying to get his breath after receiving a violent blow on the solar plexus". He described this utterance as occurring "only when approaching a water hole", and probably "evoked by pleasurable anticipation". He also suggested that it may be a mating call. We heard a vocalisation similar (or identical?) to this, but in a very different situation.

On 17th November, 1966 we immobilized an adult female black rhinoceros and her 10-month-old female calf in Ngorongoro caldera, Tanzania. By nightfall the adult had recovered sufficiently from the drugs to be concerned about the absence of her calf, which was still partially immobilized and tending to wander away.

At 2020 h when the calf and adult were 110 m apart, a "breathing" call was heard at the rate of 7/min. The calf became attentive, listened to the call, and then walked toward the adult and rejoined her within 4 min. By 2044h the calf had again wandered away, but returned when the adult repeated the "breathing" calls. This time the calls were at rate of 10/min, but the interval between calls varied from 3 to 11 sec.

During the following 2 h the calf repeatedly wandered away from its mother and each time the adult made the "breathing" call continually from the time she noticed her calf's absence until it rejoined her. In general, when the distance of separation was about 100 m, the adult uttered about 8 calls/min until the calf returned. Upon rejoining, the adult's calling ceased.

At 2245 h the distance between calf and adult was only 10 m, but the adult again made three "breathing" calls and they both walked toward each other. The calf was never heard making the calling sound. When the separation was more than 10 m the adult moved but little, and the calf made the sole effort to return in response to its mother's call.

The night was cloudy and moonless. By periodic use of the Land Rover headlights we were able to observe the movements of the pair. The adult appeared to have full control of her senses, and briefly reacted to the sight of her shadow whenever the Land Rover lights shone on her. Unless she heard the "breathing" call, the calf never had sufficient awareness to realize that she should remain close by her mother.

At 2100 h, a spotted hyaena (*Crocuta crocuta* (Erxleben)) began annoying the calf, and the calf charged it twice while the adult stood motionless. By 2140 h, eight hyaenas were snapping at the calf's tail and left hind leg. Both adult and calf actively wandered in circles, but failed to remain continuously together. The calf was becoming slightly bloodied by the attacking hyaenas, so we interceded and drove off the hyaenas. Apparently, with more time, the hyaenas could easily have killed the calf. We continued to watch the rhinos into the night until they were fully recovered and far from the territory of the hyaena clan. The pair were observed completely recovered one week later.

The "breathing" call of the adult rhino sounded very much like the sound produced when a human exhales very forcibly through his nostrils; it resembled the sound of a very deep sigh. Initially, we considered that the call was merely an anomalous respiratory condition of the adult, possibly resulting from the effect of the drugs, and this possibility cannot be ignored. However, the irregularity with which the call occurred, the calf's response to it, and its immediate cessation when the calf approached the adult, suggest that it was indeed a call.

## Reference

- RITCHIE, A. T. A. (1963). The black rhinoceros (*Diceros bicornis* L.). *E. Afr. Wildl. J.*, 1:54-62.
- George W. Frame, Department of Biological Sciences, University of Alaska, College, Alaska, 99701, U.S.A. and John Goddard, Luangwa Valley Project, P.O. Box 37, Chipata, Zambia.

The presence of *Grahamella* (Brumpt, 1911) in small mammals from Muguga, Kenya

During a survey of blood parasites in rodents and small mammals from Muguga,