VETERINARY WORK WITH OSTRICHES: A NEW RESOURCE AND A CHALLENGE FOR THE PROFESSION IN TANZANIA

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SUMMARY

The ostrich (Struthio camelus) has been farmed or ranched in Africa for many years. This is a fairly recent development in Tanzania but could be of economic benefit to the country. Those who embark upon rearing or breeding ostriches often encounter disease problems and veterinary advice is needed. In this paper some of the veterinary aspects of ostrich management are discussed with particular reference to work at one establishment near Dodoma in central Tanzania.

INTRODUCTION

The ostrich (Struthio camelus) is the largest living bird. It is flightless but able to run up to 70 km/hour. There is only one species of ostrich but several races (subspecies). The classification of the ostrich is shown and some biological data are given in Table 1.

Class	Aves
Order	Struthioniformes
Family	Struthionidae
Genus	Struthio
Species	*Camelus*

The ostrich was formerly widespread in North Africa and the Middle East but is now confined to Africa (Brown *et al*, 1982).
The ostrich has long attracted interest on account of its size and appearance. It was known to the Romans 2000 years ago. It is often depicted in medieval scenes in Europe: for example, a German book in Canterbury Cathedral Library, England contains a remarkably accurate picture of "De struthoca" (the ostrich) (Gesner, 1585).

Interest in the anatomy of the ostrich is also not new. There are dissected tissues of ostriches in the Hunterian Museum of the Royal College of Surgeons of England: these are over 200 years old (Anon, 1970). A more modern guide to anatomy of ostriches and other ratite birds is provided by Fowler (1991).

In recent years veterinary clinicians and pathologists have become involved with ostriches in zoos and wildlife parks (Bruning and Dolensek, 1986) and on account of the increasing popularity of ostrich farming or ranching (Anon, 1992; Moody, 1992; Stewart, 1992).

Coupled with this, however, concern has been expressed in Europe over the welfare of captive ostriches and other ratite birds and a recent publication deals with this in some detail (Lee, 1991). There are many

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considerations in ostrich management (Table 2) and these are not always easy to reconcile.

Although it is often stated that ostriches were first farmed in South Africa in the last century, the species was certainly kept in captivity by people in Darfur, Western Sudan, 200 years ago (Wilson, 1976) and may have been maintained or even bred by indigenous people elsewhere in Africa.

Insofar as this century is concerned, ostrich farming reached a peak in South Africa at the beginning of this century - the demand at that stage was for plumage rather than for meat - and then dropped substantially. Over the past ten years ostrich farming with a view to marketing meat, skin and plumage has become popular elsewhere and global production in 1990 is given in Table 3.

Ostrich farming in Tanzania is a relatively recent undertaking. One new enterprise is in Dodoma, the Aswan Ostrich Farm. The aim here is to develop breeding stock and later to obtain various products (skin, meat, plumage and eggs) for commercial use.

The farm was opened in November 1991. Eggs were collected under licence from the wild, mainly from Arusha. The eggs were wrapped in cotton wool and then packed in boxes. Afterwards, they were transported by road to Dodoma where they were artificially incubated. As the eggs were collected at different times and incubated on arrival, hatching also took place at different times. The newly hatched chicks were reared in a single pen for 2 - 3 weeks after which they were transferred to a larger pen (situated 40 km from Dodoma town along the Dodoma-Morogoro Highway) comprising a wire-fenced enclosure with a shelter. The birds were fed on broiler mash and water.

In this paper we discuss veterinary problems encountered at the ostrich enterprise near Dodoma during the period January-October 1992 and also briefly review the health and welfare of this species in captivity. Reproductive problems will be the subject of a separate publication.

RESULTS

Diagnoses and clinical/*post-mortem* findings during study period are listed in Table 4.

DISCUSSION

The major problem, characterised primarily by locomotor disturbances in young growing birds, was diagnosed as a nutritional/metabolic disease. The calcium content of the diet was found on analysis to be 0.88 %, far lower than the 1.5-2.5% recommended for ostriches by Bruning and Dolensek (1986). It seemed likely that other nutrients were also deficient or ratios sub-optimum. An improved diet was introduced and subsequent batches of birds grew normally, without any evidence of locomotor disease. However most of the affected birds failed to recover even when receiving the new diet; this may indicate irreversible changes in the skeleton or elsewhere or the involvement of additional factors. A full account of the problem is to be published elsewhere (Cooper and Gimbi, 1994).

The other findings were of less veterinary or economic significance but are worthy of record, since so little appears to have been published about the health of captive ostriches in Tanzania. Some will be discussed briefly.

Traumatic lesions are common, especially in birds that are recumbent or overcrowded. Ostriches can kick and will damage other birds and humans. For this reason handling

for clinical examination has to be carried out carefully (Blue-Mclendon, 1992).

The bird with penile haemorrahage was an adult male, part of the same enterprise but housed elsewhere. Bleeding may have followed attempts at copulation.

Table 1: Some biological data for the ostrich

Adult weight (Kg)	90-150
Adult height (m)	1.0-2.7
Colour	Male black and white Female grey-brown, smaller than male
Maturity	2 years (male 3 - 4 in wild)
Breeding	20-30 years
Number of eggs	In wild 5-11 per clutch, in captivity up to 90 if continual removal.
Incubation period	40-45 days
Diet	Herbivorous but invertebrates and meat will be taken, especially by young. Free-living birds survive long periods without water.
Cloacal temperature	40.3°C.
Special features	Flightless, two toes per foot, large eyes, no preen gland, no barbules on feathers, no gall bladder, urates and faeces passed separately.

The propensity of ostriches to ingest stones and foreign material has long been recognised. John Hunter, in London in the 18th century, dissected an ostrich and reported; "In the stomach there were a great many halfpence; some very much worn down; as also buttons, stones, and nails; all partly ground down@ (Palmer, 1935). Often such material is of no clinical significance but sometimes impaction occurs, in which case medical or surgical treatment is indicated (Honnas et al, 1991).

Table 2: Some considerations in ostrich management

Legal	removal of eggs from wild maintenance in captivity importation and transportation
Conservation:	status in wild, quotas (sustainable?), trade
Welfare:	management, disease, slaughter
Health:	Infectious and non-infectious disease, poor productivity
Human safety:	handling, slaughter, hygiene
Economic:	various

Table 3: Production of ostriches - 1990

Country	Number of birds
South Africa	160,000
USA	15,400
Israel	8,000
Zimbabwe	4,000
Namibia	2,000
Rest of World	7,200

(South African Farming Weekly, September 1991).

Table 4: Diagnoses and findings in live and dead ostriches

Finding	Comments
Locomotor disturbances	A major problem initially in growing birds. Diagnosed as a nutritional deficiency. Further cases did not occur following improvement of diet including calcium supplementation.
Fractures spontaneous	Probably secondary to calcium deficiency (above)
Other traumatic lesion abrasions, pressure sores, lacerations, contusion	Some secondary to recumbency due to calcium deficiency (above); others due to kicks, falls, ets.
Penile haemorrhage	Cause unclear: healed spontaneously
Foreign bodies in stomach	An incidental finding *post mortem*. Some cases of impaction. One case of proventricular perforation leading to death.
Helminth eggs in routine faecal samples	Significance unclear. Adult parasites not located. Identification of eggs in progress.
Caecal cores necrotic material	One case only (post mortem). Histopathological and bacteriological investigation failed to elucidate cause.
Mononuclear cell infection of kidney	An incidental finding in two birds. Significance unclear.
Anaemia	A consistent feature in birds with calcium deficiency (above)

Endoparasites are possibly of importance and routine screening of captive birds is planned. When possible blood will also be taken and examined for parasites as well as for haematological parameters (Palomeque *et al*, 1991).

Blood parasites were not detected in birds in this study but plasmodium struthionis has been reported from ostriches elsewhere (M.A. Peirce, personal communications). The findings illustrate the importance of routine *post-mortem* examinations and supporting laboratory tests.

Some diseases reported from ostriches in different parts of the world are given in Table 5. The list is not complete: more information is available from the references and elsewhere.

Table 5: Some infectious and non-infectious diseases of ostriches reported in the literature

Name	Comments	Reference
Aspergillosis	A problem in chicks. often contracted from brooder	Gylstorff and Grimm (1987), Perelman and Kuttin (1992) Arnall and Keymer (1975)
Anthrax	Sudden death or pyrexia	Arnall and Keymer (1975)
Atherosclerosis and arteriosclerosis	Listed, no details given	Bruning and Dolensek (1986) Frank and Carpenter (1992)
Candidiasis	As in other birds	Levy *et al* (1990)
Coronaviral enteritis	One case reported	Cooper (unpublished data)
Dehydration	Characterised by thick white urates. Can be due to many factors	Bruning and Dolensek (1986)
Dermatitis	May be due to bacteria, fungi, vitamin deficiencies	Arnall and Keymer (1975); Kon (1960)
Ectoparasites	Various lice, ticks and mites reported, sometimes associated with feather loss	Huchzermeyer (personal communications).
Endoparasites	Nematodes reported, including *Libyostrongylus douglasi* and *Houtuynia struthionis*, both in young birds. *L. douglasi* causes gastritis and anaemia	Bruning and Dolensek (1986)
Enterotoxemia	*Clostridium perfringens* implicated. Young birds on lucerne affected	
E.coli infection	May cause enteritis	
Foreign bodies in stomach	Normal or pathological, manifests as impaction or perforation - treat medically or surgically	Bruning and Dolensek (1986)

Table 5 continued

Name	Comments	References
Megabacterial gastritis	Young birds affected. Lost weight and died. Gastric lesions *post mortem*	Huchzermeyer (pers. comm.)
Newcastle disease	Reported to be rare. Usually respiratory signs	Arnall and Keymer (1975), Gerlach (1986)
Nutritional deficiencies and imbalances	Can cause locomotor problems, skeletal lesions, myopathy	Bruning and Dolensek (1986),
Poisoning	Various plants, fungi, bacteria and drugs can give rise to toxicity	Reece and Butler (1984)
Pox	As in other birds. Avian pox vaccine may protect	Huchzermeyer (pers.comm).
Pseudomoniasis	Enteric and respiratory disease	Perelman *et al* (1986)
Reproductive disorders	Low hatchability, poor chick survival and congenital abnormalities are common. Infections also occur	Arnall and Keymer (1972)
Rhinitis	Probably due to *Haemophilus gallinarum*. May involve rest of respiratory tract. Some response to antibiotics	Dinnes (1972), Hicks (1992), Wade (1992), Ley *et al* (1994)
Salmonellosis	May cause enteritis and septicaemia	Bruning and Dolensek (1986)
Staphylococcosis	Listed, no details given	Arnall and Keymer (1975)
Tuberculosis	*Mycobacterium avium*: Liver lesions	Huchzermeyer (personal communications)
Trauma	Birds may injure themselves or be chased by dogs or humans. Soft tissue damage and fractures can result	Bruning and Dolensek (1986).

Conclusions

The ostrich industry has potential in Tanzania, but if problems are not resolved this may not attained. To date, the farms cannot be run on a sustainable basis, i.e. by breeding birds in captivity; instead they depend on collection of ostrich eggs from the wild, an exercise which is unlikely to be permitted for ever and which has already prompted suspicion and criticism amongst conservationists.

From our limited experience it appears that there is a need for specialists in Tanzania, especially veterinarians and animal scientists, to put more emphasis on developing higher standards of ostrich management and veterinary care. Institutions involved in training such specialists should include information on the ostrich in their teaching programmes so as to keep pace with the increased demand for advice on this species.

Research is needed. Slaughter and transportation of live birds should be studied as a matter of urgency with a view to producing welfare guidelines and if necessary promoting specific legislation. Commercial aspects, such as plumage harvesting and marketing, also need attention. Once these and other issues are addressed we can look forward with optimism to facing the challenge of letting ostrich farming achieve its real potential in Tanzania.

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