AVIAN POX IN OSTRICHES

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ABSTRACT

Nodular cutaneous and diphtheric oral lesions resembling avian pox were observed in 2 flocks of young ostrich chicks. Typical eosinophilic intracytoplasmic inclusion bodies were seen in histological sections and a pox virus was isolated from the lesions. A commercial fowl pox vaccine was used to protect young ostriches in the field.

Key words: Ostrich, Struthio camelus, avian pox, fowl pox vaccine


Avian pox, caused by viruses of the genus Avipoxvirus, has been reported in numerous avian species. Cutaneous, diphtheric and septicemic forms of this slow-spreading infectious disease occur. Cutaneous and diphtheric pox have been reported in ostriches in Israel. This paper reports on an outbreak of avian pox in ostriches in the southern Cape Province.

During February 1993 ostrich chicks varying between 2 and 8 weeks of age were examined on a farm near George after the owner reported a mortality rate of 23/65 and skin lesions on the featherless parts of the heads of the birds. The chicks were kept on a lucern pasture together with a pair of adult ostriches, which showed no clinical abnormalities. The pasture was situated adjacent to a perennial mountain stream and swarms of insects were seen to be worrying the birds. On closer examination, discrete nodular brown lesions were seen on the eyelids, around the eyes, ears and on the beaks of the birds (Fig. 1). No lesions were seen on the legs. About 20% of the chicks were clinically affected.

Only 2 had diphtheric lesions in the mouth close to the corners of the beak.

On another farm near Oudtshoorn, 6-week-old ostrich chicks were examined during March 1993 after a mortality rate of 17/62 had been reported. These chicks were kept under intensive conditions. Other ostrich chicks in adjacent camps were not clinically affected. Nodular lesions, similar to those described in the first group, were seen. In some cases, coalescence of periocular lesions had led to closure of the eyes and secondary purulent infections.

Congestion and oedema of the oral cavity were evident in 5 of the chicks, but no cases with typical diphtheric lesions were seen in this flock.

Cutaneous lesions were collected from clinically affected ostrich chicks, fixed in 10% buffered formalin for routine histological processing and stained with haematoxylin and eosin.

Finely minced lesion material was added to a buffered lactose peptone solution (pH 7.4) containing 100 U/ml penicillin, 100 µg/ml gentamycin and 2.5 µg/ml amphotericin B. The suspension was centrifuged at 800g for 30 min and the supernatant collected for virus isolation. Primary chicken embryo fibroblast (CEF) cell cultures prepared in 25 ml tissue culture flasks (Corning, Sterilab) were inoculated with one ml of the supernatant fluid. After one hour, the inoculum was rinsed off and replaced with minimum essential medium with Earle's salts and L-glutamine (Highveld biological) supplemented with 1% non-essential amino acids (Whittaker bioproducts, Sterilab) and examined daily for cytopathic effect. An uninoculated CEF flask was kept as a cell culture control. Tissue culture fluid from CEF flasks exhibiting cytopathic effect was

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Received: August 1993 Accepted: January 1994

Fig. 1: Cutaneous pox lesions on the eyelid and beak of a young ostrich
Fig. 2: Histological section of a cutaneous pox lesion in an ostrich. Note epithelial hyperplasia, intracytoplasmic inclusion bodies (arrows) and accumulation of necrotic debris. Haematoxylin and eosin stain. x400

Fig. 3: Histological section of cutaneous epithelium of a pox lesion in an ostrich with cells containing intracytoplasmic inclusion bodies (arrows). Haematoxylin and eosin stain. x1 000

collected for electron microscopy. After one cycle of freeze/thawing, the fluid was clarified at 3 000 rpm for 20 min and pelleted on a Beckman L7 ultracentrifuge at 22 000 rpm for 90 min. The pellet was dissolved in a few drops of distilled water, applied to a carbon-coated formvar grid and stained with 3% phosphotungstic acid (pH 6,4). The grid was examined in a JEOL electron microscope at the Onderstepoon Veterinary Institute.

The specimens were also inoculated onto the chorio-allantoic membrane of 5 10-day-old embryonated chicken eggs as described and passaged twice. Five uninoculated eggs were kept as controls. The eggs were produced by the Regional Veterinary Laboratory's Leghorn flock and were frequently used to isolate fowl pox without any difficulty.

Histological examination of the lesions revealed epithelial hyperplasia together with typical eosinophilic intracytoplasmic inclusion bodies (Fig. 2 & 3). Cytopathic effect was observed in the inoculated CEF cell cultures within 5 d. Examination of the tissue culture fluid by electron microscopy revealed pox virus particles (Fig. 4). No cytopathic effect was observed in the CEF control flask. None of the chicken eggs died and no lesions were seen when the chorio-allantoic membranes were examined 7 d after inoculation.

The lesions described in the ostrich chicks resembled those of avian pox in other avian species. The diagnosis was confirmed by the typical histopathology and the isolation of a pox virus as demonstrated by electron microscopy.

Perelman et al. reproduced pox in turkeys with their ostrich isolate and used a commercial fowl pox vaccine to demonstrate cross-protection. Varying cross-relationships between *Avipoxivirus* spp exist. Further characterisation of the ostrich isolates would be of considerable value. Although fowl pox is fairly common in chickens throughout South Africa, this appears to be the first confirmed case of avian pox in ostriches in South Africa. Both outbreaks described occurred in late summer, a period characterised by considerable insect activity in the Little Karoo. Insects play an important role in the transmission of avian pox viruses.

The vaccination of the remaining healthy ostrich chicks on the 2 farms with a commercial fowl pox vaccine (Vine Vet), using the stab method, resulted in localised cutaneous "takes" at the vaccination site when examined 10 d later. Subsequent to this, no lesions resembling pox were reported in the vaccinated birds. Lesions resembling pox were later reported in ostrich chicks on a site adjacent to the farm near George.

Prophylactic vaccination of young ostriches with fowl pox vaccine could be considered in areas where they are at risk of developing pox. Avian pox usually spreads relatively slowly in a flock. Prompt vaccination of healthy ostriches in unvaccinated, clinically affected flocks, could control pox outbreaks as described in these 2 outbreaks. Ostriches which recover from infection with the field virus, would also be immune.

ACKNOWLEDGEMENTS
We wish to thank the staff of the Stellenbosch Regional Veterinary Laboratory and the Onderstepooorn Veterinary Institute Electron Microscopy Unit for their assistance.

REFERENCES


Fig. 4: Electron microphotograph of pox virus particle in fluid collected from inoculated chick embryo fibroblast tissue culture. x78 500