Ostrich Incubation Practices and Necropsy Techniques

K Button
Regional Veterinary Laboratory, Department of Agriculture, PO Box 483, Bairnsdale 3875

INTRODUCTION

South-eastern Victoria (Gippsland) is presently the centre of the emerging Australian ostrich industry. The Regional Veterinary Laboratory in Bairnsdale is well placed to provide a veterinary diagnostic service for the industry and has processed several hundred ostrich submissions (eggs, chicks and older birds) since 1989. Current incubation techniques of Gippsland ostrich farmers and necropsy techniques at the RVL are summarised below.

INCUBATION

Ten Gippsland ostrich breeders were surveyed on their incubation practices. The following summarises their (October, 1992) responses.

EGG COLLECTION AND STORAGE

All breeders attempted to collect eggs within 5 minutes to 2 hours after they were laid. This was made easier by the regular habits of hens who laid in the mid- to late afternoon on alternate days. Four breeders used disposable plastic gloves to cover their hands while handling eggs, one picked up eggs using paper towel and the other 5 used "clean hands". All stressed the need for a bed of clean sand at the nesting site. All breeders took pains to prevent eggs from becoming wet by prompt pick-up. Most subjected eggs which had become wet to additional fumigation and in one case, such eggs were incubated in a separate "high risk" incubator.

Dirty eggs were cleaned with a dry brush or wiped with damp tissue or a previously laundered and ironed cloth. No egg washing or wet disinfection was practiced.

Eggs were stored horizontally (5 breeders), or at 45° with the air cell up (5 breeders). The air cell formed within 24 hours of laying and its position was determined using a torch and marked by pencil. Six breeders stored eggs at 14-18°C while 4 stored them in a cool area at room temperature. With one exception, storage duration varied from a minimum of 1 to a maximum of 7 days. One breeder stored some eggs up to 13 days. Eggs were set in batches once or twice weekly except in the case of one person (contract incubator) who set the eggs within 24 hours of receipt.

Five of the ten breeders fumigated with formaldehyde gas either immediately before or within 1 day of setting. Four fogged their incubator rooms with "Chickguard" - a phenolic disinfectant, either soon after weekly setting (3) or daily (1). One breeder neither fumigated eggs nor fogged the incubator room.

INCUBATION

Incubators used included older wooden models such as "Peter Syme"; more modern "Multiquip E_2 " -with and without automatic turning devices; and high-tech "Buckeye", "Natureform" and "Delamaw" models. Incubator temperature settings varied from 36.1 to 36.7°C with 7 of 10 breeders incubating eggs at 36.4°C (97.5°F).

Relative humidity was controlled between 20 and 30% by 9 breeders. Incubator rooms were air conditioned. Egg weight loss was used to indicate whether humidity was too high or low. Target egg weight loss from laying to day 38 was given as 15-19% by nine breeders. Egg weights were recorded once weekly at the same time as candling. Egg weight loss was usually graphed on a chart. One farmer no longer measured humidity nor weighed eggs, but relied instead on the rate of increase in the size of the air cell to indicate the degree of moisture loss.

Eight of the breeders positioned eggs vertically with automatic turning through 90° one to two hourly. Two breeders hand turned eggs through 180° three and four times daily. The latter breeders positioned eggs either 30° above horizontal (air cell up) or horizontally.

Breeders removed eggs from the incubator between days 37 and 41, when candling indicated that internal pipping had occurred. The usual duration of incubation of ostrich eggs is 42 days, however variation of 2-3 days on either side of this were reported. A variety of hatchers were used, for example "Humidicribs" or smaller incubators such as the "Multiquip E_2" set at 36.4°C. Chicks were left in the hatcher until dry and walking. This was reported to take 12 to 48 hours. Hatching assistance was limited to cracking or drilling a small hole adjacent to the head of malpositioned or weak, slow- hatching chicks. All breeders stressed the importance of allowing chicks adequate time to hatch and applying only minimal assistance.

Following the hatching period, chicks were run in a brooding or "nursery" area. Typically these had non-slip flooring, overhead heating lamps as well as an underfloor electric blanket. Chicks were allowed outside in warm, dry weather with access to green pick, crumble, grit and water. Dung from adult birds was fed to newly hatched chicks by three breeders. Crumbled hard boiled egg was favoured as an early feed as well. Chicks were "taught" to eat and drink either by older chicks or by hand simulation of eating/drinking motions. Plastic covered "igloos" were favoured as a means of allowing chicks adequate space to exercise in inclement weather.

Necropsy Techniques

General Comment

Ostrich farmers usually need reminding that good sample quality is crucial to meaningful necropsy results. Eggs should be removed from incubators as soon as the operator is certain that the embryo has died. Eggs and dead chicks should be stored at 4°C and submitted to laboratories as soon as possible. The following techniques have been developed at RVL-Bairnsdale over the past 3 years.

Eggs

Weigh egg.

Note nature of surface- glossy/dull, smooth/matt, pore density, irregularities etc. Note if egg is whole, cracked or broken. (After completing the autopsy, shell fragments can be soaked for 30 minutes in a solution of methylene blue to accentuate the pores and make estimation of their density easier).

If not marked, candle egg to locate air cell end.

Wipe shell over air cell with alcohol-soaked tissue and crack small window in shell or drill through shell using a ca 5 cm diameter hole drill.

Note whether air cell is intact - has the inner membrane been pipped? Manually break away shell to the level of the inner shell membrane.

Excise inner shell membrane overlying contents.

No visible embryo

Describe contents.

Swab the inner surface of shell membrane and collect yolk (by needle puncture) for microbial culture.

Embryo present

Record position of near term embryos - sketch from above if necessary.

Record position of yolk sac - if external, estimate percentage external.

Weigh chick and record crown-rump length

Measure thickness in mm of subcutaneous oedema, if present, over proximal neck and thighs.

Incise abdomen, remove and weigh whole yolk sac and contents-record. Note gender.

Swab the chorioallantois and collect yolk and proventricular content by needle puncture for microbiological examination.

Collect chorioallantois (attached to the shell membrane if possible), pipping muscle,

multiple samples of thigh muscle, yolk sac, organs (heart, lung, liver, kidney) and any tissues with lesions into formalin solution.

Store liver at -20°C if biochemical tests are required eg vitamins.

Using tips of calipers, measure shell thickness to 0.02 mm at ten sites. Calculate mean thickness and SD.

CHICKS AND OLDER BIRDS

If live, bleed into EDTA and plain tubes for haematology and biochemistry profiles.

Weigh bird.

Note status of umbilicus in young chicks-is it patent, scabbed, or healed. Examine feathers for quality, lice etc.

Wet bird with weak solution of detergent. Skin abdomen, thorax and neck. Open abdomen using a mid-ventral incision and remove breast plate on both sides close to the level of the lungs. Collect the following for microbiology-yolk, if present (by needle puncture), lung, liver, ileum, faeces plus any tissues showing lesions. Submit faeces for parasitological examination.

Remove proventricular content, note nature, weigh, calculate proventricular:body weight percentage (> 4% suggests probable impaction, >10% moderate to severe impaction).

Pool proventricular and gizzard contents, wash out gravel. Note range of particle sizes and any foreign bodies. Weigh washed gravel when dry. Calculate gravel:body weight percentage.

Collect full range of tissues for histology: brain, spinal cord (if indicated), oesophagus, trachea, thymus, thyroid, lung, heart, air sac membrane, liver, spleen, adrenal, kidney, testis/ovary, proventriculus (both glandular and non-glandular areas), gizzard, pancreas, multiple sections of small and large intestine, caecum, bursa, yolk sac, umbilicus, thigh muscle, bone, tissues showing gross lesions).

Store liver -20°C if biochemical tests (eg vitamins) required.

FURTHER READING

Earle R (1992). Successful ostrich farming in southern Africa and Australia - Cabbage Tree Road, PO Marlo 3888

Finger J (1992). A guide to the theory and practice of ostrich incubation - Bellsouth Publication, Box 1223, Narre Warren, 3805

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Hastings MY (1991). Ostrich farming - "Boiardah", Winchelsea, 3241