Future Veterinary Roles in the Australian Ostrich Industry

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Summary

Over the last 10 years the Australian and International ostrich industry has undergone many changes. The lowering of individual bird values and reduction in gross margins for ostrich producers has led to a significant change in the role of veterinarians servicing the ostrich industry. No longer is the major focus on individual bird medicine and surgery. Instead, the emphasis is now on areas such as maximising chick survival and growth rates, improving feed conversion efficiency, optimising reproductive performance and involvement in management decision-making to help maximise production efficiency. This paper identifies and details key areas in which avian/ostrich veterinarians should become involved in order to best benefit their remaining ostrich farm clients.

Introduction

The ostrich industry dates back over 100 years ago. The initial phase of the industry (at the end of the last century and the beginning of this century) was based on the production and sale of ostrich feathers. This industry collapsed around 1914 with the advent of the First World War and the impracticality of ostrich feather fashion in open automobiles. The ostrich industry continued at a relatively low level in South Africa, but re-emerged after the Second World War. This re-emergence was initially in South Africa, but began to later occur in several other countries including Australia in the 1980's. This second significant phase of the industry was based on forecasts of future leather and meat product sales and demand.

The quality of the meat and leather, as well as the excellent food conversion efficiency of young ostriches, are attributes of the industry that are generally unchallenged. However, many new ostrich industries that became established in several countries had a naïve and inflated expectation of the depth and stability of existing global ostrich leather and meat markets. This led to significant competition in relatively small markets and dramatic reductions in prices. The development of the ostrich industry in Australia has seen A Grade hide prices fall from $50 USD per square foot to less than $21 USD per square foot over the past 5 years. Ostrich meat prices have fallen at a similar rate over that period. Added to this has been the inability of Australian ostrich farmers to consistently produce a high percentage of high quality, saleable hides leading to further reductions in returns per processed ostrich.

These market trends and the increase in the ostrich population have resulted in the following changes in Australia:

- cessation of the high individual bird values seen up until the mid 1990's in the so-called "breeding phase" of the industry[2];
- exit from the industry by most smaller ostrich producers and the emergence of larger vertically integrated ostrich farms; and
- reduction of the demand for veterinary services due to a change in emphasis from individual bird treatment to overall flock health issues.

The remaining ostrich producers in Australia are now very focused on maximising efficiency and profitability and many are recognising the advantages of consulting experienced veterinarians in this goal.

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FUTURE VETERINARY ROLES

Overall Flock Health Monitoring and Preventative Health Advice

The success of flock health schemes is dependent on a number of vital elements:

1. Experience and skill level of the consulting veterinarian
2. Willingness and ability (financial and physical) of the producer to respond to veterinary advice
3. Quality of facility's infrastructure and record keeping
4. Availability and quality of nutrition
5. Favourable climatic conditions
6. Genetic quality of stock

In commencing his/her involvement at a particular ostrich farm the consulting veterinarian should initially:

- familiarise him/herself with the farm layout and facility design
- determine and assess the management practices employed in all facets of the farm from incubation to breeder management
- analyse the nutritional content of all rations used on the property
- examine all complete records over the last 2-3 years
- determine and analyse any major problems encountered – past or present
- develop a general impression of the health status and quality of the ostriches (all ages) on the property

This initial work should be followed by a detailed written report including comments about the present performance of the farm, areas requiring improvement and their relative priority, targets for future performance and requirements for ongoing monitoring.

Some realistic targets that can be set include[3]:

Fertility	80%
Hatchability (of fertile eggs)	90%
Chick survival rate to 4 months	75%
Survival rate from 4 months to slaughter age	90%
Target weight at 10 months of age	90-100 Kg
Eggs per hen	40-70
Chicks (surviving to 3 months of age) per hen	20-30
Area of hide per bird at slaughter	14-17 sq feet
Boneless meat per bird at slaughter	25-30 Kg
Ratio of Grades A, B and C/D hides for all birds slaughtered	60/30/10

The areas of performance, which I find are often sub-optimal in Australia, are chick survival, number of chicks per hen, hide quality and meat yield. The veterinarian can have significant impact on these issues by focusing on areas such as *disease control and prevention, breeder assessment and culling, facility design, management and nutrition.*

Disease Control and Prevention

The greatest single contributor to disease in ostrich farming still remains *management.* Although disease outbreaks can often involve pathogens generally classified as primary and virulent such as Pseudomonas, Salmonella and virulent E.coli strains, management factors are generally implicated in initiating and allowing the establishment of disease. Such factors as overcrowding, lack of quarantine, insufficient batching of chicks, inadequate nutrition, sudden diet or environmental changes and inappropriate temperature or ventilation conditions for chicks are most commonly implicated.

An accurate diagnosis and quick and appropriate control measures are vital to controlling the spread of disease on a large-scale ostrich farming operation. Thorough autopsy examination of deaths in significant numbers or in circumstances that are not readily explained is critical. As in many other avian species, diseases in ostriches can appear clinically similar and histopathological examinations as well as bacteriological and sometimes virological examination are needed. Many of the disease of chicks involve the gastrointestinal tract and so *fresh* autopsies are essential to diagnosis because the intestinal tissue will autolyse within a very short period after death. The quality of the laboratory's diagnostic results will depend on the quality of the submitted samples to the laboratory. Multiple sections of all areas of small and large intestine should be taken and fixed as soon as possible. Tissue samples from other organs such as liver, spleen, proventriculus, gizzard, kidney, heart, lung, air sacs, Bursa, bone marrow, muscle, brain etc should also be submitted.

I cannot stress more strongly, however, the need to look beyond the pathological or clinical diagnosis and investigate possible predisposing management factors that have initiated or perpetuated the disease.

Control measures will generally include isolation, disinfection, quarantine and treatment strategies and may well also involve humane slaughter of potential carriers. Preventative measures can include correction of management errors, quarantine, parasite monitoring (and treatment programs when needed) and vaccination.

Vaccination can be worthwhile in some cases. The most common pathogens targeted for vaccination are *Clostridium perfringens,* poxvirus and autovaccines of bacterial isolates. However, the primary agent is often not identified and consequently a vaccine is targeted only at secondary agents[4].

C. perfringens enterotoxaemia and enteritis can be a difficult disease to definitively diagnose, especially without the aid of toxin assays. The disease has been strongly suspected in many cases in Australia, especially involving sporadic deaths of juvenile and young adult ostriches, often following a significant dietary or environmental change. The lack of adequate fibre intake has been implicated in some clostridial disease outbreaks. Clostridial enteritis in young chicks has not been commonly diagnosed in Australia. The only published investigative studies on *C. perfringens* disease in ostriches has occurred in South Africa and these studies implicate *C. perfringens* Types A, B & D as potentially pathogenic. Because of this, I would recommend that any practitioner contemplating the instigation of *C. perfringens* vaccination programs on ostrich farms to consider the use of a clostridial vaccine incorporating cover for ***all*** *C. perfringens* types.

Poxviral outbreaks that have been encountered in ostrich chicks in Australia have usually involved Fowlpox virus. Scabby lesions of the beak and periorbital areas are the most common clinical symptoms. These lesions are usually self-limiting unless secondary infections have also occurred. In these latter cases, spectacular proliferative, granulomatous lesions have sometimes led to depression and reduced food intake and other secondary infections. Most outbreaks have occurred in mosquito infested areas - especially if relatively close to commercial poultry units. Control measures have included topical and systemic treatment of secondarily infected lesions, vector control and, in some cases, vaccination has been used to prevent further outbreaks.

E.coli, along with *Pseudomonas* sp. and possibly *Salmonella* sp. and *Campylobacter* sp., are the most common bacterial pathogens of ostriches in Australia. Again, primary management factors are almost always implicated and need to be addressed in controlling disease and prevention of further disease outbreaks. Culture/sensitivity investigation is definitely required, as many of these bacteria are often resistant to commonly used antibiotics. It should be remembered that as ostriches are now food-producing animals, written withholding period advice should be given when administering any drugs for use in ostriches. Some cases of ongoing bacterial infections have been controlled by also employing the use of autogenous vaccines. However, in my experience, autovaccines have been generally ineffective in fully controlling disease and preventing further outbreaks. More

cost-effective means have been using treatment/isolation and eradication principles combined with addressing management issues.

Facility Design

Most ostrich farms have been developed on an "as needed" basis with little or no overall planning concept used. Consequently, they are often inefficient and may, in fact, be conducive to disease spread. When designing an ostrich facility it is essential to consider the overall plan of the facility. Veterinarians, especially if experienced in flock or herd health management, can often recognise danger areas in facility designs with respect to health risk, stress etc. Traffic flows must be from "clean" to "dirty", young to old and healthy to diseased. Climatic conditions[5], prevailing wind direction, topography, access and proximity of "production units" should all be taken into account. Ideally, incubation/hatching, chick-rearing, feedlotting (if present) and breeding areas should all be well separated and even located on different farms. Adequate quarantine and isolation areas are often overlooked in ostrich facility design.

Management

Inexperienced ostrich farmers or ostrich farmers who have recently scaled up to large numbers will often require management guidance and advice from experienced ostrich veterinarians. If the management techniques are basically flawed, performance of birds will begin to decline with stress factors such as high stocking density, poor nutrition, adverse weather conditions and poor genetic quality. Eventually, if not corrected this poor performance will be followed by disease outbreaks.

Ostrich management in each of the areas:

Incubation/Hatching
Infant Chick Rearing
Older Chick Rearing
Juvenile/Pre-slaughter Bird Growing
Breeder Units

are detailed topics in themselves, and certainly ones which could not be adequately covered in this paper. Experience is essential, but certain basic principles apply. For example:

- adequate hygiene and biosecurity in the management of incubation and hatching
- optimal incubation and hatching conditions are essential to ensure the best chances of survival of young chicks
- assisted or weak hatchlings have poor survival rates
- chicks with hatch weights below 700grams have poor survival and subsequent growth potential
- environmental, nutritional and hygiene control are important factors in infant chick (less than 4-6 weeks of age) rearing
- if sufficient "safe" and nutritious green feed (such as lucerne) is not available for young chicks it is often better to then consider rearing them on bare ground with adequate supplementary feed
- ad lib feeding techniques are recommended for young chick (less than 3-4 months of age) rearing
- overcrowding will usually result in disease problems over time
- balanced proven nutrition rations are absolutely essential for young chicks up to 3-4 months of age and breeding birds and, if not available to older chicks and juvenile birds, growth performance may be affected
- batching of chicks is essential to successful rearing
- adoption of a "Closed Flock" management strategy is an important factor in minimising the incidence of disease
- protection of feed, adequate shelter/shade and protection from predators or nuisance animals are important for all age groups of ostriches
- chicks less than 50 kilograms body weight do not respond well to feedlotting[6]
- feedlot and older chick rearing management should ideally involve regular drafting of batches to minimise significant weight and size variation
- overnight lighting in feedlots can minimise fence collisions and traumatic injuries
- breeders should be subjected to minimal disturbance during the breeding season
- all breeding ostriches should be spelled for at least 3-4 months between seasons

- genetic selection programs are essential to optimal performance
- observation is a critical element of good ostrich farm management
- consultation between producer and ostrich veterinarian ***BEFORE*** major management decisions are made will yield best results

Breeder Assessment and Culling

On farms with large numbers of breeders there will always be a significant number of poor or non-performing breeders. These birds need to be identified, as they will contribute significantly to inefficiency and poor profitability. This is an area where the consulting ostrich veterinarian can be of enormous value. On farms where breeders are kept in pairs or trios identification of these birds will depend on good record keeping and observation. However, if the breeders are kept in colonies, the identification of these poor performing birds may be extremely difficult without veterinary intervention.

Aggressive, disruptive males can usually be identified by personnel on the farm. These birds can contribute to lowered egg production and trauma in the hens in that particular breeding unit. They can also lead to lowered fertility rates and traumatic injuries in other male birds due to an increase in fighting behaviour. They are also a menace and danger to personnel involved in egg collection. The provision of shelter and "safety zones" in breeder paddocks will minimise the negative affect of these males. Ideally, they should be culled or tried in other units to see if the problem behaviour still occurs and, if so, should then be definitely culled.

A high incidence of infertility within a breeding unit should initially be approached by employing keen observation. Most infertility problems in ostriches are due to behavioural or environmental influences, immaturity or malnutrition. In incidences of known complete and normal copulation behaviour with resultant infertility, semen collection and evaluation may be helpful in deciding whether to cull a male or not. Semen collection and evaluation is only advised for experienced ostrich veterinarians as false negative results can commonly occur due to poor technique, stress on the bird, timing of the test, etc.

The identification of many non, or poor performing hens can be confirmed by the use of ultrasound examination. Ultrasound examination of hens using a trans-abdominal 3.5mHz probe can identify conditions such as ovarian inactivity, egg retention, egg yolk peritonitis and abdominal neoplasia. If there is any doubt about differentiating a retained egg from a normally developing egg in the oviduct[7], the hen can be relocated in the paddock and observed for 48 hours and, if necessary re-examined with the ultrasound. The lack of normal oviductal motility can also lead to a tentative diagnosis of egg retention.

Investigation of hens for problems with egg quality or high rates of embryo mortality or egg infection can involve keen observation, clinical examination of the hen including oviduct swabbing and culture/sensitivity testing or sometimes trial antibiotic treatment. Other factors such as immaturity, malnutrition and inappropriate incubation technique should also be considered.

Nutrition

Because nutrition is the most significant cost to ostrich producers, it is often targeted as the area in which some of the major savings can be made by reducing quantity or quality. This inevitably leads to one or more of the following:

- poor breeder performance (reduced egg quality, fertility, hatchability and increased embryo and infant chick mortalities and increased congenital abnormalities)
- increased incidence of disease in all age groups
- secondary developmental problems in growing chicks
- poor growth rates and subsequent increased age reached before attaining slaughter weight or reduced return at slaughter.

Thus, it can be "false economy" to significantly reduce feed bills if it is at the expense of an adequate and well balanced diet.

Consulting ostrich veterinarians need to familiarise themselves with the latest in valid nutritional research and information. This is a relatively new and continually developing field in which there are few recognised experts. Examination and assessment of the full statistical analyses of all diets used on the ostrich facility is necessary.

This assessment can highlight potential deficiencies or toxicities and avert possible future problems in advance.

Genetic Selection Programs

In order to continually increase profitability through improved productivity, there is a need to instigate a genetic selection program. This program should be overseen by the consulting veterinarian as much as possible. A full assessment of the overall flock performance through analysis of the complete farm productivity records should initially be done. This will highlight the areas that are in greatest need of improvement. Once these priorities have been identified certain traits can be targeted for selection. Selecting for only one or two *productivity* traits such as growth rate and dressing percentage will see the quickest and greatest response. Selection for *reproductive* traits generally yields a slower and weaker response. If too many traits are selected for at any one time the response will be poor. Heritability figures have not yet been fully assessed in ostriches at this time and so extrapolation from known heritability figures from other avian species such as poultry normally occurs. Close observation for the emergence of less desirable traits during this program is essential[8].

If sufficient depth of genetic variation exists within the resident ostrich flock, there may be no need to access new stock from outside sources. However, in many cases new genetic stock needs to be acquired form other producers. The adherence to a "closed flock" philosophy is a key to minimising the incidence of disease in ostrich flocks. The sourcing of new genetic material from outside this flock represents a risk to an otherwise stable environment. Thus, this step must be taken with caution and due diligence must be carried out to assess the potential source flock for:

1. quality of stock and the potential improvement likely to be encountered in the prioritised traits

2. health status and the potential disease entry risk.

Once the new stock have been selected strict quarantine practices must be followed before allowing entry of this stock to the resident ostrich population. The importing of **young** chicks less than 6 months of age onto a property and mixing with resident young chicks – even after quarantine procedures – should be avoided.

CONCLUSION

Experienced ostrich/avian veterinarians have much to offer the developing commercial ostrich industry in Australia at this critical and pivotal stage. Ostrich producers can make significant gains in productivity and reduce losses through poor performance and mortalities by consulting with such veterinarians before making critical decisions in farm management and husbandry. Procedures such as general flock health and management evaluation, breeder examination and culling, disease investigation (including any necessary autopsy examinations), consultation in facility design decisions, evaluation of dietary statistical analyses, initiation and overseeing of preventative health measures and the monitoring of genetic selection programs are all skills that the ostrich veterinarian can provide.