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Some Causes of Organ and Carcass Condemnations in Ostriches Slaughtered at the Only Ostrich Abattoir in Zimbabwe from 1999-2005

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Abstract: A retrospective study was conducted to determine the causes of ostrich carcass and organ condemnations in Zimbabwe for the period 1999-2005. Records of meat inspection available at the single ostrich abattoir in Zimbabwe were used in this study. The number of ostriches slaughtered for the whole study period was 55 957. The total number of ostriches slaughtered decreased by 84.8% from 1999-2005. The average age and weight at slaughter were 11 months and 110 kg respectively. The liver was the most frequently condemned organ, mainly due to fatty degeneration, parasitic infestations, cysts, cirrhosis and melanosis. The second most condemned organ was the lung, mainly due to congestion. Traumatic lesions were the main macroscopic findings associated with wing and neck condemnations, while abscessation and pericarditis were mainly associated with gizzard and heart condemnations respectively. Septicaemia was the only cause of whole carcass condemnations and resulted in the condemnation of 0.005% of the slaughtered ostriches. Only a year effect was noted on liver condemnations, which peaked during 2004 and 2005 mainly involving months from May to August. The rest of the condemnations showed neither a month or year effect. No zoonotic causes of condemnations were recorded. Optimal management practices on the farm and observation of proper methods during transportation and slaughtering are some of the ways that may be used to reduce incidences of condemnations.

Key words: Ostrich, abattoir records, condemnations, prevalence

INTRODUCTION

Commercial ostrich farming in Zimbabwe began in 1985 and the growth of the industry has been promoted through increases in numbers of birds and the creation of an infrastructure to support the industry (Cooper, 1999a). There has been an increase in global market competition, making farm efficiency an imperative priority for producers (Cooper, 1999b).

Livestock diseases and condemnation rates at slaughter can give a useful guide to the incidence of the less acute, chronic, mild and subclinical diseases that occur in production animals in regions served by various abattoirs (Chambers, 1987; Mallia *et al.*, 2000). Therefore, information gathered on animals slaughtered at an abattoir can be a convenient and inexpensive source of information (Roberts and Suhardono, 1996). The data can be used to determine trends in prevalence and significance of the disease(s) especially where the reporting system is reliable (Roberts and Suhardono, 1996). Farmers can then use the information so gathered to improve the husbandry and efficiency of their farming operations and remain competitive on the global market (Edwards *et al.*, 1999).

While many reports exist on the causes of carcass and organ condemnations for a variety of livestock species based on abattoir records (Vassilev and Jooster, 1991;

Bergmann *et al.*, 1995; Bisaillon *et al.*, 1988; Herenda and Jackel, 1994; Jacob *et al.*, 1998; Pfukenyi and Mukaratirwa, 2004), only one such study exists for ostriches slaughtered in Botswana (Dzoma *et al.*, 2009). The objectives of this study were therefore to determine the causes of ostrich carcass and organ condemnations at slaughter in Zimbabwe for the period 1999-2005 and to recommend some ways of minimizing loss through condemnations and possible production depressions.

MATERIALS AND METHODS

Meat inspection records available at the single ostrich abattoir in Zimbabwe and located in Norton (17° 52' 60S, 30° 41' 60E) about 40km south-west of Harare were reviewed for the period 1999-2005. At the abattoir, post-mortem inspections were carried out in line with FAO general principles on ante-mortem and post-mortem inspection of food animals (<http://www.fao.org/docrep/003/t0756e/T0756E01.htm>). Data from monthly and annual returns were analyzed for the specific causes of organ condemnations and the organs that were condemned. The year on year condemnation rates for specific organs were computed as the number of times that the particular organ was condemned in that year, expressed as a percentage of the total number of times the organ was condemned over the study period. In

Zimbabwe, ostrich producers send their animals for slaughter to the single abattoir whose records were used in this study. State meat inspectors routinely inspect the slaughtered carcasses and state public veterinary health officers supervise the inspection of the carcasses. The inspection is done independently of the abattoir owners and hence they do not have any influence on the inspection.

Statistical analysis: Arcsin transformation of the calculated proportions was done to approximate a normal distribution. A General Linear Model using SAS 2000 was used to determine if there were significant variations in the prevalence of monthly and yearly condemnations of organs and carcasses.

RESULTS

A total of 55 957 ostriches were slaughtered between 1999 and 2005. The average age and weight at slaughter were 11 months and 110 kg respectively. The total number of ostriches slaughtered per year fell drastically by 84.8% from 1999-2005 (Fig. 1).

The liver was the most commonly condemned organ, with the most commonly encountered macroscopic lesions being fatty degeneration, parasitic infections (histomoniasis), cysts, melanosis and cirrhosis (Fig. 2). The amoeboid form of *Histomonas* species was confirmed in affected liver specimens on microscopic examination. Grossly, the affected livers had a yellowish to greenish colour.

Only a year effect was noted on liver condemnations, which peaked during 2004 and 2005, mainly involving months from May to August (Fig. 3).

Lungs were mainly condemned owing to congestion. The congestion was mostly attributed to improper stunning and bleeding methods. Condemned lungs were channeled into pet food production. Wing and neck condemnations were mainly due to trauma that occurred mainly during loading, transportation and off loading of the ostriches. There was no month or year effect on the prevalence of organs condemned due to trauma. Gizzards were mainly condemned due to abscessation, while heart condemnations were mainly due to blood splashing, petechial haemorrhages and pericarditis. The causes of condemnations for all organs, apart from those of the liver, showed neither a month or year effect. Only 0.005% of the carcasses were condemned over the study period, as a result of septicaemia. No zoonotic causes of condemnations were noted in this study.

DISCUSSION

The total number of ostriches slaughtered in Zimbabwe decreased from 1999-2005, reaching the lowest levels in 2005. The decrease in slaughter numbers could have been related to the decrease in production owing to inflation-related feed input cost escalations noted earlier

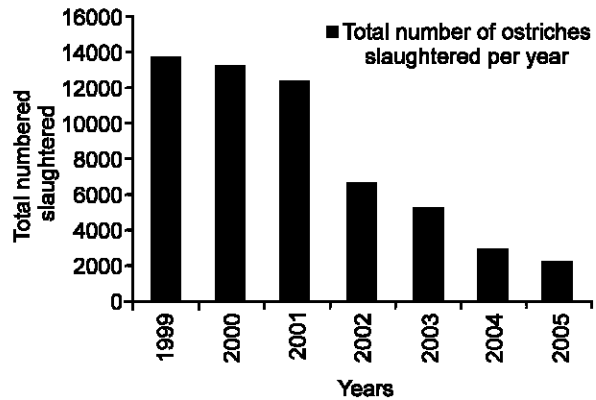


Fig. 1: The yearly distribution of ostriches slaughtered between 1999 and 2005

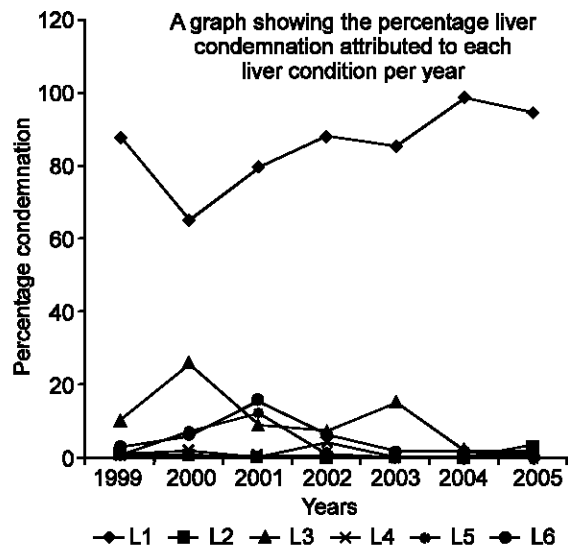


Fig. 2: The main causes of liver condemnations in slaughtered ostriches. L1-Fatty degeneration, L2-Liver abscesses, L3-Parasites, L4-Cirrhosis, L5-Cysts, L6-Melanosis

by Pistorius (1998). The most frequently condemned organ was the liver, involving fatty degeneration, parasitic infection (histomoniasis), cysts, melanosis and cirrhosis. These causes of condemnations were most likely acquired during the life stages of the ostriches, and hence farm related. The liver is a primary and central organ in the body, therefore, any disturbances to its function may interfere with production, either clinically or sub clinically.

Fatty liver degeneration was the most common cause of liver condemnations. In ostriches, fatty degeneration and megalocytosis have been associated with plant poisoning (Cooper, 2007). Fatty liver syndromes are common in companion birds (Macwhirter, 2000). In chickens, the fatty liver syndrome has been associated

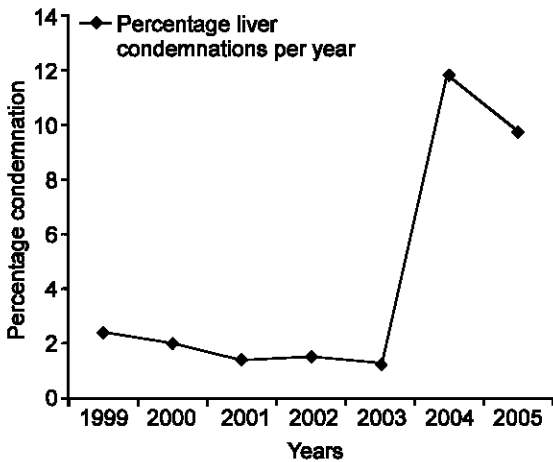


Fig. 3: The yearly distribution of liver condemnations from 1999-2005

with a drop in egg production, mortality of up to 5%, or both (Butler, 1976). Fatty infiltration of tissues, the liver included, may result from a deficiency of biotin, niacin, or choline. These vitamins are essential for the mobilization of body fat through the liver (Butler, 1976). In turkeys, hepatic lipidosis has been observed with up to 4.5% mortality and was associated with possible amino acid deficiencies (Gazdzinski *et al.*, 1994). Possible causes of fatty liver syndrome of birds include dietary deficiencies of methionine and cysteine which are required for the synthesis of apolipoprotein, high environmental temperatures, overcrowding, stress, hormonal imbalances (high estrogen and low thyroid), and genetic predisposition (Pearson and Butler, 1978; Squires and Leeson, 1988). In cows, fatty liver is associated with decreased health status, well-being, productivity and reproductive performance (Wensing *et al.*, 1997). Since not much is known about the causes of fatty liver syndromes in the ostrich and their effects on growth and production, studies on this issue are mandatory. However, since aspects of nutrition (vitamin and amino acid deficiencies) have been implicated, feed analysis, the provision of supplements as well as proper feed storage and mixing could be vital in preventing incidences of fatty degeneration of the liver and other associated production losses.

Liver infection with *Histomonas* species was also a significant cause of liver condemnation. *Histomonas* is a protozoan parasite which cause a disease commonly known as blackhead in turkeys and has been associated with typhlitis and hepatitis in the ostrich (Borst and Lambers, 1985). This amoebic parasite uses the cecal worm, *Heterakis gallinarum*, as its vector. Ante-mortem measures that can be taken to reduce the occurrence of histomoniasis include good management practices such as hygiene to reduce vector levels, separating the adults from the young and isolation of the

sick from the healthy. Young birds must be raised on the floor and regular removal of faecal material carried out (McDougald, 2005). Treatment of affected ostriches involves the use drugs like dimetronidazole or nitrothiazole in drinking water for 12 days (McDougald, 2005).

The other causes of condemnations such as cysts, abscesses, septicaemia and cirrhosis would warrant a diagnostic survey (bacteriology, histopathology, PCR etc.) to enable the etiologies to be elucidated. For instance, infections involved in liver abscesses in cattle, pigs and other livestock are known, but information is not available for the ostrich.

Lung congestion and blood splashing are associated with improper stunning and bleeding and also featured prominently in abattoir studies in Botswana (Dzoma *et al.*, 2009). Losses may be minimized through observing proper abattoir procedures. Wing, neck and leg fracture also led to condemnation of the respective organs. Since the trauma was associated with transportation, adequate padding in transporting vehicles should be ensured. The ostriches must also not be overcrowded during transportation as this can lead to piling, causing traumatic conditions. Premixing of the ostriches could be done before loading them to avoid fighting during transportation, which might lead to fractures or even death.

In a similar study involving Botswana ostriches (Dzoma *et al.*, 2009), the lung was the most frequently condemned organ followed by the liver. The most frequently encountered macroscopic findings in these lungs were contamination and congestion, all being abattoir associated. Results in this study, on the other hand, indicate farm related causes of condemnations, which mainly featured fatty degeneration and protozoan infections among others. In this regard, more intervention mechanisms are indicated on Zimbabwean farms in order to curtail condemnations, especially those of the liver and also the possible production losses that may be associated with liver problems. As stated earlier, plant poisoning and some vitamin deficiencies (Butler, 1976; Gazdzinski *et al.*, 1994; Cooper, 2007) as well as high environmental temperatures, overcrowding, stress, hormonal imbalances (high estrogen and low thyroid) and genetic predisposition (Pearson and Butler, 1978; Squires and Leeson, 1988) have previously been associated with fatty liver syndromes of birds and need further investigations on Zimbabwean farms. Routine feed analysis and the good management practices listed above (McDougald, 2005) may be used as intervention methods in the meantime.

Also, as in the Botswana study, no zoonotic causes of condemnations were noted, further reinforcing the suggestion that ostrich meat remains among the meat types with low public health risks (Dzoma *et al.*, 2009).

Conclusion: The most prominent causes of organ condemnations involved the liver and were farm associated, thereby calling for further studies on farm activities that may be involved. Whole carcass condemnation occurred on 0.005% of the slaughtered birds and involved septicemia, which also mostly likely occurred during the lifetime of the birds on the farm. A few abattoir related causes of condemnations were noted, while no zoonotic causes of condemnation were recorded. Optimal management practices on the farm and observation of proper methods during transportation and slaughtering are some of the ways that may be used to reduce incidences of condemnations.

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