



## Examination of the Lung and Liver for Pathological Changes in Hunted Grasscutters (*Thryonomis swinderianus*) in Southwest Nigeria

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### SUMMARY

This study investigated the pathological changes in the lungs and liver of some hunted grasscutters in order to reduce mortality and enhance their domestication. The grasscutters were sourced from hunters from low rain forest to rich savanna ecological zones in southwestern Nigeria. The sampling period was from May to October 2016. A total of thirty carcasses were used for this study. The lungs and liver were examined grossly and microscopically using standard technique. Pneumonia was present in 17 (56%), consisting of Pulmonary congestion in 4 (13%), Interstitial pneumonia in 13 (43%), and Bronchopneumonia in 4 (13%), while 9 (30%) lungs were apparently normal. The hepatic lesions included centrilobular hepatocellular degeneration, and severe multifocal necrotizing hepatitis. In conclusion, pneumonia is a major disease present in grasscutters, with interstitial pneumonia being the most prevalent pneumonia. Adequate housing and management of grasscutter should ensure minimal stressors that may hinder pulmonary clearance mechanisms.

**Key words:** Cane rats, Diseases, Domestication, Nigeria

### INTRODUCTION

The grasscutter is widely distributed in Africa and it is being exploited as source of animal protein (Asibey, 1974; Baptist and Mensah, 1986; Alarape, 1999). The average animal protein intake in Nigeria remains quite below international recommendation (FAO 1992). This has necessitated the rural households, to explore alternative sources of animal protein to complement the conventional livestock (Asibey and Addo, 2000). Cane rats appear to be a good alternative source of protein and provide farmers with additional income (Jori et al., 2001; Olomu et al., 2003; Opara et al.,

2006). It is the most expensive meat in most countries in West Africa including Nigeria, Togo, Benin, Ghana and Cote d' Voire (Asibey, Addo 2000). It contributes to both local and foreign earnings in these countries (Ntiamo-Baidu, 1998).

Therefore, the African grasscutter (*Thryonomis swinderianus*), is aggressively hunted (Yeboah and Adamu, 1995; Opara et al., 2006) and attempts at domestication have not been so successful due to the poor understanding of its biology, lack of Veterinary care and other management factors (Byanet et al., 2008). Efforts have

been made to study seasonal variation, weight, and structure of the animal (Okorafor *et al.*, 2013; Byanet *et al.*, 2011). However, not much study has been done on the diseases affecting grasscutters, which is one of the major causes of economic loss in grasscutter production (Van veen *et al.*, 1974; Opara and Fagbemi, 2010; Jaiyeoba *et al.*, 2014; Jaiyeoba *et al.*, 2015).

The grasscutter has been reported as a reservoir host for parasitic diseases including trypanosomiasis, babesiosis, gastrointestinal helminths and protozoa (Opara and Fagbemi, 2008; Opara, 2012). From the reports of the survey carried out by Awah- Ndukum (2007) in Western Cameroon, respiratory diseases account for about 29.19% of diseases in grasscutters.

With adequate knowledge on their diseases, mortality could be reduced to maximize performance and economic benefits. This study was carried out to provide insight into the organ pathology of grasscutters in order to reduce mortality and enhances their domestication.

## MATERIALS AND METHODS

### Study area and animals

This study area covered Southwestern part of Nigeria. The ecology is that of low rain forest to rich savanna. The grasscutters were sourced from local hunters who captured the animals from the wild for sale in Ibadan. The sampling period was from May to October 2016. A total of thirty carcasses were used for this study.

### Postmortem examination

The grasscutters presented were already dead either from the gunshots or from the injury of capture. The number of grass cutters captured, the breed and the season of the year were recorded. The lung and the liver were examined grossly for colour, size, texture and consistency; and pathological changes observed were described. Tissue samples from both affected and normal lung and liver were taken and fixed in 10% neutral buffered formalin for histopathology.

### Statistical analysis

Data was descriptively analyzed and presented as percentages and mean, after which they were represented in charts. Morphological diagnoses were also correlated.

## RESULT

### Incidence, Breed and distribution

The number (n= 19; 63%) of grasscutters captured in the dry season was more than the number (n= 11; 27%) captured in the rainy season. The breed observed was the *Thryonomys swinderianus* otherwise known as greater Cane rats, which is the one, found in this part of the continent.

### Pathology

#### Lung

The normal lungs were collapsed, rubbery and pinkish in colour. The congested lungs were non collapsed and diffusely dark red. Pneumonia was present in 17 (56%) of the grasscutters examined. The lungs with interstitial Pneumonia were also non-collapsed, diffusely meaty in consistency. The bronchopneumonic lung was cranioventrally consolidated, dark red and firm (Plate 1A).

Microscopically, bronchopneumonia was characterized by infiltration by macrophages and neutrophils around the bronchioles and in the alveolar spaces. Interstitial pneumonia was characterized by distension of the interstitium and alveolar septae due to congestion, oedema and cellular infiltrates including macrophages and lymphocytes. While bronch-interstitial pneumonia was characterized by both interstitial and alveolar changes (plates 1B and 1C).

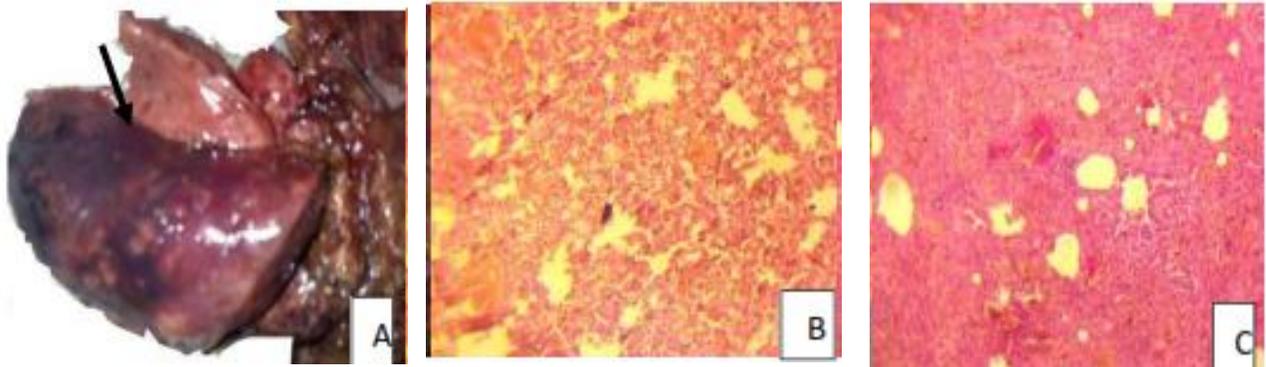
Morphologically, there was Interstitial pneumonia in 13 (43%), Bronchopneumonia in 4 (13%), Pulmonary congestion in 4 (13%), while there were 9 (30%) apparently normal lungs. In both gross and histopathological diagnosis, interstitial pneumonia was the most prevalent in the grasscutters. Microscopically,

bronchopneumonia was characterized by infiltration by macrophages and neutrophils around the bronchioles and in the alveolar spaces. Interstitial pneumonia was characterized by distension of the interstitium and alveolar septae due to congestion, oedema and cellular infiltrates including macrophages and lymphocytes. While bronch-interstitial pneumonia was characterized by both interstitial and alveolar changes (plates 1B and 1C). Morphologically, there was Interstitial pneumonia in 13 (43%), Bronchopneumonia in 4 (13%), Pulmonary congestion in 4

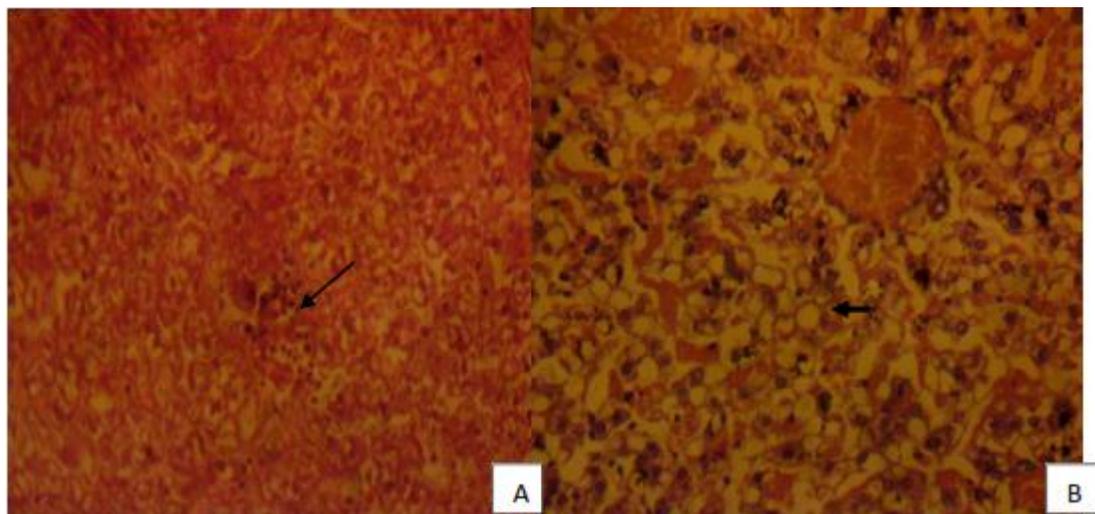
(13%), while there were 9 (30%) apparently normal lungs. In both gross and histopathological diagnosis, interstitial pneumonia was the most prevalent in the grasscutters.

#### Liver

Of the 30 samples examined; 6 had hepatic lesions (20%) and the remaining 24 (80%) were grossly normal. The hepatic changes were pale areas, focal to multifocal, while 3 (10%) of the livers were friable, enlarged and dark red.



**PLATE 1:** Lungs: A- Showing cranioventral consolidation of the lungs of grasscutter (arrow). B- Photomicrograph of the lungs showing diffuse capillary congestion. HE X100. C- Photomicrograph of the lungs showing diffuse moderate thickening of the alveolar septae due to infiltration of inflammatory cells. HE X100



**PLATE 2:** Photomicrographs of the Liver: A- Showing hepatocellular coagulation necrosis with perivascular neutrophilic infiltrates (arrow) HE x100. B- Showing diffuse hepatocellular vacuolar degeneration (arrow) and marked Kupffer cell hyperplasia

The histological changes include centrilobular hepatocellular degeneration; severe multifocal necrotizing hepatitis (plate 2A) and mild neutrophilic infiltrates with Kupffer cell hyperplasia, and diffuse hepatocellular atrophy (plate 2B).

## DISCUSSION

This study reports the incidence of pulmonary and hepatic lesions in grasscutters in savanna region of Western Nigeria.

The number of grasscutters captured in the dry season was more than the number captured in the rainy season, which was in agreement with the early study carried out by Okorafor (2013).

There was high degree of pneumonia in the grasscutters, which further confirms the study of AwahNukum (2006). The incidence of pneumonia in grasscutters was 27% as compared to 5% recorded in pigs (Asenso *et al.*, 2015), 69% in small ruminants (Emikpe *et al.*, 2013), 1.25% in dogs (Okunsanya *et al.*, 2014). Emikpe *et al.* (2016) also reported the incidence of pneumonia in Wild species present in Zoological garden (35.1%). This study agreed with the reports of Fatokun *et al.*, (2010) which shows pneumonia as a major source of mortality in grasscutters.

Interstitial pneumonia was the most prevalent pneumonic pattern seen in the grasscutters as opposed to bronchopneumonia seen in small ruminants (Emikpe *et al.*, 2013), dogs (Okunsanya *et al.*, 2014), pigs (Asenso *et al.*, 2015) and wild ruminants (Emikpe *et al.*, 2016), although interstitial pneumonia is also recorded as the most prevalent pneumonic pattern in wild carnivore animals (Emikpe *et al.*, 2016). Interstitial pneumonia being the most prevalent pneumonia seen in the grasscutters, shows that grasscutters are more susceptible to causes of interstitial pneumonia which may include; hypersensitivity reactions, viruses, and or other idiopathic causes.

Pulmonary congestion can also be a sign of interstitial pneumonia, but it cannot be confirmed as pneumonia, due to the fact that pulmonary congestion could also be a sign of other diseases condition such as heart disease or could even be due to mode of death.

This study signifies that majority of hepatic diseases in grasscutters are not infectious in nature. Thus attempt at diagnosing hepatic diseases in grasscutters should be made towards conditions that cause hepatic degeneration and necrosis such as poisoning, hypoxia, hepatic lipidosis, metabolic disturbances, and hormonal imbalances (Olomu *et al.*, 2003). Infectious causes of hepatic lesions in grasscutters are similar to those seen in other rodentia species which include leptospira, listeria, francislla, clostridia (bacteria), hydatid, cysticercus, fasciola, capillaria, hepatozoon (parasitic), mouse hepatitis virus, hantavirus (viral) and many more infectious agents (AwahNukum *et al.*, 2006). Most of the hepatic changes are toxic in nature. Thus, these animals would serve as sentinels for environmental toxicity, while the causes of these toxic changes should be investigated.

Knowledge of the pattern of pneumonia is important to know the diseases to vaccinate against, and other precautions to be taken to prevent mortality in production of the animal, and in domestication of grasscutters. In conclusion, pneumonia is a major disease condition present in hunted grasscutters. The pneumonia could either be interstitial pneumonia, bronchopneumonia or bronchointerstitial pneumonia. And the animals are more susceptible to interstitial pneumonia. However, housing and management should ensure minimal stressors that may hinder pulmonary clearance mechanisms.

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