

STUDY OF REASONS FOR SEIZURE IN SMALL RUMINANTS IN SOUTHEASTERN ALGERIA SLAUGHTERHOUSE

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Abstract: Butcher's meat and its offal intended for human consumption are subject to mandatory sanitary inspection at the slaughterhouse level by veterinary inspectors. Our objective is to determine the main reasons for seizures at the Biskra slaughterhouse during a three-month period with a number of 2303 slaughtered animals (sheep and goats). We noted 975 seizures (42.33%), mostly sheep (46.20%) ($p < 0.001$). The most affected organs in both species were the lungs (90.10% and 87.5% respectively in sheep and goats) and the liver (10.71% and 8.71% respectively in goats and sheep) ($p < 0.001$). The other organs seized were the heart, kidneys and head. The main reasons for seizures were abscesses, pneumonia, hydatidosis and respiratory strongyles. The different reasons for seizures at the slaughterhouse remind us of the need to strengthen preventive measures upstream to fight against the pathologies at the origin of these crises.

Key words: sheep, goat, organ, lesions, Biskra.

INTRODUCTION

Livestock in Algeria has 28.4% million head of sheep and 5 million head of goats (MADR, 2018). The production of red meat in Algeria comes mainly from sheep breeding (56%) and that from goat breeding represents 8%. These farms, which are largely extensive, are linked to a highly profitable internal market due to the maintenance of demand at a relatively high level and the low elasticity of internal supply. Sheep meat production amounted to 325,000 tons; goat meat production reached 42,000 tons. The average consumption of red meat per capita is 14.4 kg per year (MADR, 2018). These productions are intended to supply the national market, or for family self-consumption.

Health threats, often new, can develop at the interface of the human and animal ecosystem. Most diseases cause characteristic lesions that allow them to be recognized at the slaughterhouse during meat inspection. The slaughterhouse is an appropriate place to observe the health status of livestock. The collection of sanitary information at slaughterhouse level contributes to improving knowledge of the national epidemiological situation. As such, it represents an integral part of the disease surveillance system.

MATERIAL AND METHODS

The Biskra region (34° 48' 00" north and 5° 44' 00" east) is located in southeastern Algeria at the foot of the southern slope of the mountain range of the Saharan Atlas which constitutes the limit between the north and southern Algeria. It is located at an average altitude of 125 m. The capital of the wilaya is located 400 km south-east of the capital Algiers. The wilaya covers an area of 21,671 km² (A.N.D.I, 2013). The geographical position of the wilaya of Biskra gives it an arid climate, characterized by a very hot and dry summer (average maximum temperature of 43.5°C) and a cold winter (12°C). In winter, the Biskra region is dominated by cold and more or less humid winds coming from the high plateaus and the North-West. On the other hand, in summer the winds which blow from the South and South-East are hot and dry (sirocco). They are very frequent during the months of July and August. In spring and even in summer, sandstorms that take a south-westerly direction are a common phenomenon in the study region (Menacer, 2012).

Our study is transversal and exhaustive. It relates to the slaughtering and seizures carried out in the Biskra slaughterhouse. Thus, two visits per week were made during the study period. The data collected relate to the number of small ruminants slaughtered, the number of carcasses examined and the number of seizures.

The animals selected for slaughter have undergone an ante-mortem inspection in respect of the muslim ritual and the applicable law. The post-mortem inspection underwent a careful examination of the elements of the 5th quarter. This examination is based on the classic method of macroscopic examination, taking into account criteria such as the size, shape, consistency and color of the organs and the systematic incision of each organ to detect the presence of pathological masses.

Microsoft Excel 2016 and IBM SPSS Statistics were used to analyze data. Confidence intervals were at the 95% confidence level. Using R version 4.1.3 software, comparisons of the percentages were performed by the Chi2 test. P-values <0.05 were considered significant.

RESULTS AND DISCUSSION

Out of a total of 2,303 slaughtered animals (sheep and goats), 1,989 were sheep, which corresponds to a rate of 86.37%. The total number of goats is 314, which corresponds to a rate of 13.63%. The overall seizure rate was 975 (42.33%) cases of seizures. Table 1 presents the distribution of seizures by species. The majority of seizures were made on sheep (46.20% vs 17.83% in goats) (p<0.001).

Table 1: Number of animals slaughtered and seizure rate

	Slaughtered animals	Seizures n (%)	95% CI	p-value
Sheep	1989	919 (46,20)	44-48,4	2.2e-16***
Goats	314	56 (17,83)	13,6-22,1	
Total	2303	975 (42,33)	40,3-44,3	

95% CI (%):95% confidence interval,***: highly significant.

The distribution of organs seized in sheep and goats is shown in Table 2. The most seized were the lungs (89.95%) and the liver (8.82%), and to a lesser extent the heart (0.72%), kidneys (0.31%) and head (0.20%). Statistical analysis revealed a highly significant difference between the different organ seizure rates ($P < 0.001$).

Table 2: Seizure rates by organ in sheep, goats and total.

Seized organs	Sheep		Goats		Total		p-value
	N	%	n	%	n	%+IC	
Livers	80	8.71%	6	10.71%	86	8,82±1.78	0.000***
Lungs	828	90.10%	49	87.5%	877	89.95±1.88	
Hearts	6	0.65%	1	1.79%	7	0.72±0.53	
Kidneys	3	0.33%	0	0%	3	0.31±0.34	
Heads	2	0.21%	0	0%	2	0.20±0.28	

Freq±CI (%): frequencies plus or minus confidence interval. ***: highly significant.

Our results made it possible to distinguish twelve reasons for seizure: hydatidosis, fasciolosis, cysticercosis, respiratory strongyles, tuberculosis, coenurosis, emphysema, pneumonia, hepatization, abscess, pericarditis and urolithiasis. The distribution of the data collected by reason for seizure and by category of animal is presented in (Table 3).

Table 3: Reasons for seizures in sheep, goats and total

Reasons for seizures	Sheep		Goats		Total		Signification test
	n	%	n	%	N	%	
Hydatidosis	171	18.60%	16	28.57%	187	19.18%	NS
Fasciolosis	2	0.22%	0	0	2	0.20%	NS
Cysticercosis	3	0.33%	1	1.79%	4	0.41%	***
Respiratory strongyles	171	18.60%	0	0	171	17.54%	***
Tuberculosis	5	0.54%	0	0	5	0.51%	***
Cœnurosis	2	0.22%	0	0	2	0.20%	***
Emphysema	86	9.36%	7	12.5%	93	9.54%	NS
Pneumonia	205	22.31%	13	23.21%	218	22.36%	NS
Hepatization	2	0.22%	5	8.93%	7	0.72%	***
Abscess	263	28.62%	13	23.21%	276	28.31%	NS
Pericarditis	6	0.65%	1	1.79%	7	0.72%	***
Urolithiasis	3	0.33%	0	0	3	0.31%	NS

NS: Not significant ***: Highly significant

The highest overall prevalence was recorded for abscesses with 28.31%, then pneumonia in second place with 22.36%. The lowest prevalences were recorded for

urolithiasis (0.31%), coenurosis (0.20%) and fasciolosis (0.20%). Statistical analysis did not reveal significance, except for coenurosis ($p < 0.001$).

We noted that respiratory lesions were the cause of the majority of seizures in sheep with 18.60%, 9.36%, 18.60% and 22.31% respectively for hydatidosis, respiratory strongyles, emphysema and pneumonia. The same is true in goats for hydatidosis, emphysema and pneumonia with respectively 28.57%, 12.5% and 23.21% ($p > 0.05$). For the same organ, hepatization lesions are significantly higher in goats (8.93%) than in sheep (0.22%), this difference between species is highly significant ($p < 0.001$).

We also noticed the highly significant absence of certain pathologies in goats such as respiratory strongyles, coenurosis and tuberculosis and non-significant for urolithiasis and fasciolosis compared to sheep.

The frequency of slaughter in the region depends on the type of breeding. During the study period, the number of sheep slaughtered in the Biskra slaughterhouse is 1989 (86.37%) is greater compared to goats 314 (13.63%). This is explained by pastoralism in the Algerian steppe which constitutes the main production system while being a way of life characterized by mobility and the use of natural resources (Kanoune et al, 2007). In sheep, the seizure rate is 46.20% against 17.83% in goats. The seizure of two organs, the lungs and the liver are the most dominant for the two species. However, it is more important in the ovine species, 90.09% and 8.7% respectively, against 87.5% and 10.71% in goats respectively. This corroborates with studies done at the slaughterhouse level in Nigeria (Cadmus and Adesokan, 2009); in southern Benin in Cotonou/Porto-Novo (Ohouko, 2013) and in Ethiopia (Regassa et al, 2013). The incidence of infestation and the sensitivity of the lungs and liver is high compared to other organs, explained by their anatomical and physiological characteristics; they are richly vascularized filter organs, which promotes the tropism of pathogens towards them (Grist, 2011). Concerning the seizure of other organs, in particular the heart, kidneys and the heads, the numbers remain low as shown in Table 2.

In terms of sanitary reasons, thirteen reasons for seizure were found. By comparing the prevalence between the two species, we realize that some reasons for seizures are predominant in one species and minority in the other. In sheep 28.62% were seized for reason of abscess against 23.21% in goats. This corroborates with observations made by (Ouchene et al, 2014) in Algeria and (Ansari-Lari, 2005) in Iran which report the same observations with varying rates. The formation of abscesses is often the result of an infection by one or more germs such as *Corynebacterium pseudotuberculosis*, *Staphylococcus aureus*, *Streptococcus spp* (Baroudi et al, 2010) or faulty hygiene with too high animal density in the sheepfolds. The use of traumatic equipment (feeders, drinkers and metal fences) seems to be the main factor favoring the spread of abscesses (Alloui et al, 2008; KICHOU et al, 2016).

From the data collected at the Biskra slaughterhouse, our results show a predominance of hydatidosis lesions in goats with a frequency of 28.58% against 18.60% in sheep. Our findings go in the same direction as those of the Mediterranean region (Seimenis, 2003) who finds a higher incidence in sheep in Algeria. However, our results are in contradiction with the observations made in other regions of Algeria in Tiaret by koudri et al, (2012); koudri et al (2013), El Tarf and Ouargla by Ouchene, (2014) and in other countries such as Morocco by Azlaf and Dakkak (2006), and Tunisia by Lahmar et al (2004). This difference can be explained by the variation in

temperature, the difference in strain between *E. granulosus*, the type and mode of extensive farming and the cohabitation of sheep and goats (Saidi et al 2020). Indeed the place of the goat herd is not always capital where its role can be secondary which brings it on the same course as the sheep, and therefore are exposed to the same degrees of infestation. This extensive farming method or the presence of a large number of dogs would be the main cause of the infestation of ruminants as well as other parasitic pathologies because these two species are raised in communities and in the open air in close contact with domestic dogs, considered a risk factor by its role in maintaining the parasitic cycle by promoting its dissemination. Saidi and al found that the dog is a guard animal present in 72% of farms. Hydatidosis is a pathology whose prevalence varies according to the country and in the different regions of the same country (Banks et al, 2006).

In our study the pattern of seizures for pneumonia are almost similar with a frequency of 22.31% and 23.21% in sheep and goats respectively. This has also been observed in mixed farms by Saidani (2019) and Saidi et al (2020). This is consistent with the dominant extensive farming method. These lung seizures cause significant economic losses.

In the sheep species the reason for seizure with respiratory strongyles was 18.60%. Our results are higher than those observed in Turkey (Yildiz, 2006), but lower than those observed in Morocco (Paliargues et al, 2007), and in Ethiopia (Addis et al, 2011). This are explained by the extensive farming method and the large number of sheep in this region sharing the same pastures. The absence of lesions in goats lies in the food mode; it is a species that does not graze, which protects them from contamination.

Emphysema and hepatization were observed at lower rates in sheep 9.36% and 0.22% and in goats at a rate of 12.5% and 8.93% respectively. The same observation has been made in Benin (Kiki et al, 2021). These are respiratory pathologies due to climate change and poor ventilation in the sheepfolds. The lesions described are relatively common in most domestic animal species in general and in small ruminants in particular (Dakkak A, 2003).

CONCLUSIONS

Our work has highlighted a predominance of pathologies with a parasitic etiology, particularly at the pulmonary level. In small ruminants, these diseases reflect poor farming conditions where prophylactic tools are absent. This has a direct impact on human health for two reasons; the first is that some of these diseases are zoonosis such as hydatidosis whose parasitic cycle is maintained by small ruminants. The second concerns consumers because the majority of the reasons for seizure lead to alterations in the carcasses causing toxi-infections. It is for these reasons that the veterinarian is the most important link in the policy of improving public health.

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