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Characterization of hoof injuries in sheep (*Ovis aries*) in the State of Tocantins, Brazil

Caracterização de lesões em cascos de ovinos (Ovis aries) no Estado do Tocantins, Brasil

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ABSTRACT: The aim of this study was to characterize and establish the prevalence of foot lesions and stages of footrot in sheep flocks in the State of Tocantins, Brazil, during dry and moist seasons. A total of 339 sheep (*Ovis aries*) were examined during the period of September 2014 to May of 2015. Procedures for animal examination and age estimation were performed. All animals were divided in three groups: G1, G2 and G3 using the Egerton's modified score system for footrot. Foot lesions were classified as: double sole (DS), overgrowth (OG), white line disease (WLD), moderate interdigital dermatitis (MID), severe interdigital dermatitis (SID), horizontal crack (HC) and other injuries (OI). No significant difference was observed when comparing the same group in different periods, however there was difference between groups in the same period. In dry and moist season, G1 was greater than G2 and G3. The most prevalent lesion per limb observed in dry and moist season was OG. This difference was also observed for DS, OG+WLD, OG+MID, OG+SID, OG+HC and OI. The only lesion that was more prevalent in dry season when compared to moist season was OG+DS. This exploratory study provides key insight into the prevalence of foot lesions of sheep in two distinct seasons, and the occurrence of concomitant lesions. Animals of all ages were classified as moderate to severe footrot according to the modified Egerton scoring system, during moist season.

KEYWORDS: Small ruminants; Foot lesions; Egerton's system; Overgrowth lesion; Double sole lesion.

RESUMO: O objetivo deste estudo foi caracterizar e estabelecer a prevalência de lesões podais e estágios de footrot em rebanhos ovinos no Estado do Tocantins, Brasil, durante as estações seca e úmida. Foram examinados 339 ovinos (*Ovis aries*) durante o período de setembro de 2014 a maio de 2015. Foram realizados procedimentos de exame dos animais e estimativa de idade. Todos os animais foram divididos em três grupos: G1, G2 e G3 utilizando o sistema de pontuação modificado de Egerton para footrot. As lesões nos pés foram classificadas em: sola dupla (DS), crescimento excessivo (GO), doença da linha branca (LD), dermatite interdigital moderada (DMI), dermatite interdigital grave (DIS), fissura horizontal (CH) e outras lesões (IO). Não foi observada diferença significativa ao comparar o mesmo grupo em períodos diferentes, porém houve diferença entre os grupos no mesmo período. Na estação seca e úmida, o G1 foi maior que o G2 e o G3. A lesão mais prevalente por membro observada na estação seca e úmida foi a OG. Essa diferença também foi observada para DS, OG+WLD, OG+MID, OG+SID, OG+HC e OI. A única lesão mais prevalente na estação seca quando comparada à estação úmida foi OG+DS. Este estudo exploratório fornece informações importantes sobre a prevalência de lesões nas patas de ovinos em duas estações distintas e a ocorrência de lesões concomitantes. Animais de todas as idades foram classificados como podridão moderada a grave de acordo com o sistema de pontuação de Egerton modificado, durante a estação úmida.

PALAVRAS-CHAVE: Pequenos ruminantes; Lesões nos pés; sistema de Egerton; Lesão de crescimento excessivo; Lesão dupla na sola.

INTRODUCTION

Lameness remains one of the most important welfare issues affecting the sheep industry. Over 80% of flocks contain lame sheep, with a prevalence in some flocks of over 9% for footrot and over 15% for scald (Winter, 2004). Other surveys have found that the incidence of foot disorders varies from approximately 10% to 19%, and overgrown hooves are one of the most common foot disorders (Pugh et al., 2021).

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Conditions such as laminitis, interdigital dermatitis, interdigital fibroma and infectious pododermatitis/footrot negatively affect sheep productivity by causing pain and discomfort to animals (Kaler; Green, 2008). Being footrot a severe, contagious disease of sheep, that leads to significant economic losses as a result of weight loss, low fleece weight, labor and treatment costs, decreased milk production, and premature culling (Christodoulopoulos, 2009; Pugh et al., 2021).

Despite a documented hereditary predisposition, environmental factors are the most important in determining the occurrence of foot-related lameness, being moist and warm environment one of the most critical risk factors (Gelasakis; Kalogianni; Bossis, 2019). Although some studies have already been carried out on the prevalence of these hoof injuries, the role of these factors in the prevalence of hoof injuries, from the same region in different seasons remains poor defined.

Therefore, the aim of this study was to characterize, and establish the prevalence of stages of footrot (Glynn, 2003) and other foot lesions of sheep flocks of different ages and according to limbs affected, in the north-central region of the State of Tocantins, Brazil, comparing dry and moist seasons.

MATERIALS AND METHODS

Ethics

This study was approved by the Ethics Committee on the Use of Animals of Tocantins Federal University (23101.000839/2014-19) and attended ARRIVE Guidelines (Percie Du Sert et al., 2020).

Animals

A total of 339 sheep (Ovis aries) of different breeds, sex and ages, all in semi-extensive breeding systems, were examined, being a total of 1356 limbs. On the months of September of 2014 – end of dry season (160 animals, 27 males and 133 females) and May of 2015 - end of moist season (179 animals, 27 males and 152 females), 14 different properties of 5 cities of the north-central region of the State of Tocantins (10°10'2.82"S, 48°19'39.58"W), Brazil, were visited.

Study design

Animals were examined in September of 2014, with average temperature of 28.2oC and sum of precipitation of 4.4mm (INMET, 2014), and May of 2015 with average temperature of 26.0oC and sum of precipitation of 689.2mm (INMET, 2015). In each period they were classified into three experimental groups according to the degree of injury presented, in a cross-sectional observational study, using the modified Egerton's scoring system [6], where: Group 1- score 0 (non-injured animals); Group 2- scores 1 and 2 (moderate interdigital dermatitis and severe interdigital dermatitis) and Group 3- scores 3, 4 and 5 (severe interdigital dermatitis and onset of necrosis in the heel and sole region, and severe interdigital dermatitis with necrosis extending across the entire sole to the wall and severe necrosis inside and outside the hull extending across the wall). See Figure 1 and Table 1.

They were also individually classified according to age estimated from the number of incisor teeth present (Spence; Aitchison, 1986), and according to foot lesion in each limb. Also, foot lesions were classified as: double sole (DS), overgrowth (OG), white line disease (WLD), moderate interdigital dermatitis (MID), severe interdigital dermatitis (SID), horizontal crack (HC) and other injuries (OI).

Animal examination

Procedure for animal examination initiated with general visual assessment to identify any lameness sign. All animals that presented lameness and 20% of the total herd were manually contained, had age estimated, the limbs were lifted, and the hoof cleaned with a brush, water and soap, examined and photographed in order to classify the type of injury, using the Egerton's modified score system (0 – 5) (Glynn, 2003). The injuries found were also registered in a table, considering the animal identification number and the limb affected.

Statistical analysis

Each variable was tested for normal distribution using Shapiro-Wilk test. The results obtained were assessed using Two Way Analysis of Variance (Two-way ANOVA), followed by post-hoc Holm-Šídák's or Tukey multiple comparisons test for differences among groups and sampling times. All the described statistical analysis was performed using GraphPad Prism version 9.2.0 (La Jolla, CA, USA). Significance for all tests was assumed when $p<0.05$.

RESULTS

Considering group divisions using the modified Egerton's scoring system (Glynn, 2003) for footrot, no significant difference

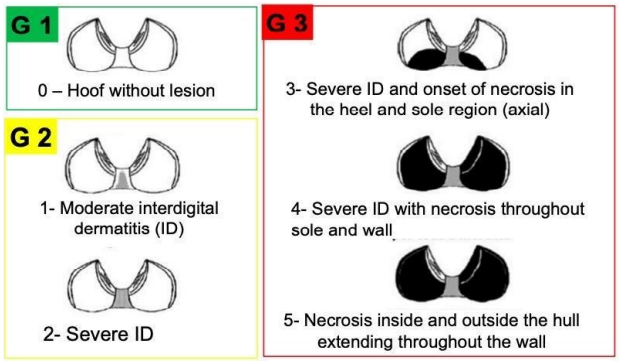

Figure 1. Experimental groups according to the degree of injury presented using the modified Egerton's scoring system.

was observed when comparing the same group in different periods (table 2) (p=0.193), however there was difference between groups in the same period (p=0.001). In Dry and Moist season, G1 was greater than G2 (p=0.011 and p=0.011; respectively) and G3 (p=0.011 and p=0.011, respectively).

Considering ages subdivided in groups according to lesions and the periods of examination (table 3 and figure 2), there was no significant difference between animals in the same group and different ages, but there was significant difference between the number of animals in the same age, but different groups and periods of

Table 1. Summary of data collection according to animal examination in both periods.

Groups	According to Egerton's score	Ages	Foot lesions and combinations
G1	Group 1- score 0 (Non-injured animals)	Less than 1 y/o	Double sole (DS)
G2	Group 2- scores 1 and 2 (Moderate interdigital dermatitis and severe interdigital dermatitis)	1,0 a 1,5 y/o	Overgrowth (OG)
G3	Group 3- scores 3, 4 and 5 (Severe interdigital dermatitis and onset of necrosis in the heel and sole region, and severe interdigital dermatitis with necrosis extending across the entire sole to the wall and severe necrosis inside and outside the hull extending across the wall).	1,5 a 2,0 y/o	Overgrowth + double sole (OG+DS)
		2,5 a 3,0 y/o	Overgrowth + white line disease (OG+WLD)
		3,5 a 4,0 y/o	Overgrowth + moderate interdigital dermatitis (OG+MID)
			Overgrowth + severe interdigital dermatitis (OG+SID)
			Overgrowth + horizontal crack (OG+HC)
			Other injuries (OI)

Legend: Double sole (DS), Overgrowth (OG), White Line Disease (WLD), Moderate Interdigital Dermatitis (MID), Severe interdigital dermatitis (SID), Horizontal crack (HC), other injuries (OI), Left forelimb (LF), Right forelimb (RF), Lefl hindlimb (LH) and Right hindlimb (RH).

Table 2. Number of animals and prevalence [%(n)] in their respective classification group according to Egerton's modified scoring system for footrot, in Dry and Moist season.

	Dry season (N=160)	Moist season (N=179)	Time effect (p)	Group effect (p)
G1	153^{Aa} (95.6)	153^{Aa} (85.5)	0.193	0.001
G2	07^{Ba} (7.0)	18^{Ba} (10.1)		
G3	00^{Ba} (0)	08^{Ba} (4.5)		

^{A,B} Different capital letters in the same column indicate significant differences (p<0.05), using the Holm-Šídák multiple comparison test, between groups at the same time. ^{a,b} Different lowercase letters on the same line indicate significant differences (p<0.05), by the Holm-Šídák multiple comparison test, between times in the same group.

Table 3 . Number and prevalence (n%) of animals according to age and their respective classification group according to Egerton's modified scoring system in Dry (September 2014) and Moist seasons (May 2015) in the north-central region of Tocantins.

Period	Dry season (N=160)			Moist season (N=179)		
Groups	**G1**	**G2**	**G3**	**G1**	**G2**	**G3**
Less than 1 y/o	43^{Aa} (26.9)	00^{Ab} (0.0)	00^{Ab} (0.0)	37^{Aa} (20.7)	03^{Ab} (1.7)	02^{Ab} (1.1)
1.0 to 1.5 y/o	28^{Aa} (17.5)	00^{Ab} (0.0)	00^{Ab} (0.0)	25^{Aa} (14.0)	04^{Ab} (2.2)	01^{Ab} (0.6)
1.5 to 2.0 y/o	11^{Aa} (6.9)	00^{Ab} (0.0)	00^{Ab} (0.0)	22^{Aa} (12.3)	01^{Ab} (0.6)	01^{Ab} (0.6)
2.5 to 3.0 y/o	12^{Aa} (7.5)	01^{Ab} (0.6)	00^{Ab} (0.0)	16^{Aa} (8.9)	01^{Ab} (0.6)	01^{Ab} (0.6)
3.5 to 4.0 y/o	59^{Aa} (36.9)	06^{Ab} (3.8)	00^{Ab} (0.0)	53^{Aa} (29.6)	09^{Ab} (5.0)	03^{Ab} (1.7)
Total	153 (95.6)	07 (4.4)	00 (0.0)	153 (85.5)	18 (10.1)	08 (4.5)

^{A,B} Different capital letters in the same column indicate significant differences (p<0.05), using the Holm-Šídák multiple comparison test, between groups at the same time. ^{a,b} Different lowercase letters on the same line indicate significant differences (p<0.05), by the Holm-Šídák multiple comparison test, between times in the same group.

examination. Group G1 (with no lesions) had the highest number of animals in all ages, in dry and moist seasons (95.6% and 85.5%, respectively with N=153 in both seasons), when compared to G2 (4.4% with N=07 and 10.1% with N=18, respectively) and G3 (0% with N=0 and 4.5% with N=08, respectively).

In table 4, mean and standard deviation (SD) of injured limbs is presented according to each lesion or combination of lesions in each period of examination. In dry season, OG

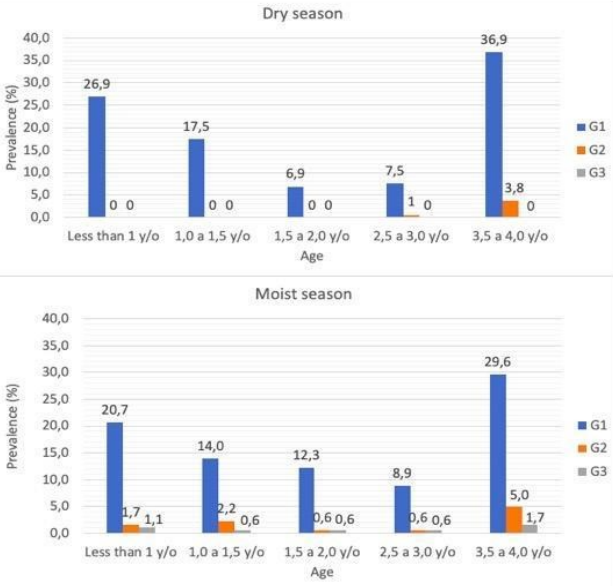

Figure 2. Prevalence (n%) of animals according to age and their respective classification group according to Egerton's modified scoring system in Dry (September 2014) and Moist seasons (May 2015) in the north-central region of Tocantins.

Table 4 . Mean and standard deviation (SD) of injured limbs according to each lesion or combination of lesions in each period of examination in properties of the north-central regions of the State of Tocantins.

Period	Dry season (N=160)	Moist season (N=179)
No lesion	32±3.7^{Aa}	3.3±1.5^{Ab}
DS	20±9.0^{Aa}	0^{Bb}
OG	83±10.0^{Ba}	157±4.2^{Cb}
OG+DS	23±4.0^{Aa}	4±0.8^{Ab}
OG+WLD	0.5±0.6^{Ca}	2.5±1.3^{ABDa}
OG+MID	0^{Ca}	4.3±1.7^{ABa}
OG+SID	0^{Ca}	1.8±1.7^{ABDa}
OG+HC	0^{Ca}	2.5±1.9^{ABDa}
OI	2.3±0.9^{Ca}	4.3±1.7^{ABDa}

Legend: Double sole (DS), Overgrowth (OG), White Line Disease (WLD), Moderate Interdigital Dermatitis (MID), Severe interdigital dermatitis (SID), Horizontal crack (HC), other injuries (OI), Left forelimb (LF), Right forelimb (RF), Lefl hindlimb (LH) and Right hindlimb (RH). ^{A,B} Different capital letters in the same column indicate significant differences ($p<0.05$), using the Tukey's multiple comparisons test, between mean of injured limbs according to each lesion. ^{a,b} Different lowercase letters on the same line indicate significant differences ($p<0.05$), by the Holm-Šídák's multiple comparisons test, between period of examination.

(83±10) had significant difference compared to all other types of lesions. DS (20±9) and OG+DS (23±4) had no significant difference between each other ($p= 0.910$), however both had significant difference when compared to OG ($p<0.0001$ and $p<0.0001$, respectively), OG+WLD ($p<0.0001$ and $p<0.0001$, respectively), OG+MID ($p<0.0001$ and $p<0.0001$, respectively), OG+SID ($p<0.0001$ and $p<0.0001$, respectively), EG+HC ($p<0.0001$and $p<0.0001$, respectively) and other injuries ($p<0.0001$ and $p<0.0001$, respectively). In moist season, OG (157±4) had significant difference compared to all other types of lesions and all other lesions had no significant difference between each other.

The number of affected limbs and respective foot lesion or combination of lesions per period of examination is in table 5. A greater number of limbs with no lesion is seen in dry season when compared to moist season (19.7% and 1.8%, respectively). In dry season, left fore and hindlimb, and right fore and hindlimb had less prevalence of lesions when compared to moist season (80.6%, 77.5%, 80.0, 83.1 and 99.4%, 97.8%, 97.8% and 97.8%, respectively). The most prevalent lesion per limb observed in dry and moist season was OG (51.7% and 87.4%, respectively). This difference was also observed for DS (12.3% and 0%, respectively), OG+WLD (0.3% and 1.4%, respectively), OG+MID (0% and 2.4%, respectively), OG+SID (0% and 1%, respectively), OG+HC (0% and 1.4%, respectively) and OI (0% and 2.4%, respectively). The only lesion that was more prevalent in dry season when compared to moist season was OG+DS (14.5% and 2.2%, respectively).

DISCUSSION

In September of 2014, the dry season was ending, after a three-month period (June, July, and August) of average temperature of 28.2oC and sum of precipitation of 4.4 mm (INMET, 2014). In May of 2015, the moist season was ending after 8 months, but to obtain a comparable proportion, the last 3 months of this period presented an average temperature of 26.0oC and a sum of precipitation of 689.2 mm (INMET, 2015). These climate differences, especially in precipitation measurements, leave clayey soils with little drainage and stony terrain, with a lot of mud and animal waste (urine and feces), this excess is the ideal environment for the maintenance of infectious agents (keratinolotics) that can damage the hoof (Cavalcante et al., 2005; Carvalho et al., 2018). Plus, considering that the animals are in a semi-extensive system, grazing during the day in humid areas and closed in corrals at night, this continued action ends up devitalizing the interdigital space and the hoof wall, facilitating traumas leading to ulcers on the sole, granuloma and white line disease (Aguiar et al., 2011), and penetration of infectious agents (Graham; Egerton 1968). Also, other factors could be the introduction of sick animals, that arrive to the moist season without prophylactic trimming or unnecessary overcutting, with a hoof out of plump and the beginning of a lesion, often without

Table 5. Distribution and prevalence [%(n)] of foot lesion or combination of lesions per limb and period of examination.

Period	Dry season (N=160)					Moist season (N=179)				
Limb	**LF**	**LH**	**RF**	**RH**	**Total of limbs per lesion**	**LF**	**LH**	**RF**	**RH**	**Total of limbs per lesion**
No lesion	31 (19.4)	36 (22.5)	32 (20.0)	27 (16.9)	126 (19.7)	01 (0.6)	04 (2.2)	04 (2.2)	04 (2.2)	13 (1.8)
DS	30 (18.8)	13 (8.1)	25 (15.6)	11 (6.9)	79 (12.3)	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	0 (0.0)
OG	76 (47.5)	89 (55.6)	73 (45.6)	93 (58.1)	331 (51.7)	161 (89.9)	151 (84.4)	156 (87.2)	158 (88.3)	626 (87.4)
OG+DS	21 (13.1)	19 (11.9)	26 (16.9)	27 (16.9)	93 (14.5)	05 (2.8)	04 (2.2)	03 (1.7)	04 (2.2)	16 (2.2)
OG+WLD	01 (0.6)	00 (0.0)	01 (0.6)	00 (0.0)	2 (0.3)	02 (1.1)	03 (1.7)	04 (2.2)	01 (0.6)	10 (1.4)
OG+MID	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	0 (0.0)	04 (2.2)	05 (2.8)	06 (3.4)	02 (1.1)	17 (2.4)
OG+SID	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	0 (0.0)	01 (0.6)	04 (2.2)	02 (1.1)	00 (0.0)	7 (1.0)
OG+HC	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	0 (0.0)	00 (0.0)	04 (2.2)	02 (1.1)	04 (3.4)	10 (1.4)
OI	01 (0.6)	03 (1.9)	03 (1.9)	02 (1.3)	9 (1.4)	05 (2.8)	04 (2.2)	02 (1.1)	06 (3.4)	17 (2.4)
Total lesions per limb	129 (80.6)	124 (77.5)	128 (80.0)	133 (83.1)	514 (80.3)	178 (99.4)	175 (97.8)	175 (97.8)	175 (97.8)	703 (98.2)

Legend: Double sole (DS), Overgrowth (OG), White Line Disease (WLD), Moderate Interdigital Dermatitis (MID), Severe interdigital dermatitis (SID), Horizontal crack (HC), other injuries (OI), Left forelimb (LF), Right forelimb (RF), Lefl hindlimb (LH) and Right hindlimb (RH).

treatment, which facilitates the transmission of the disease. Furthermore, the wrong treatment applied by farmers and the lack of preventive measures contributes to the occurrence of new cases. This, joined to the loss of interest and systematicity of the farmers in controlling the disease becomes cyclical, recurring every rainy season. All of these factors are believed, together with moist season, contribute to the increase in the number of lesions observed.

Considering infectious pododermatitis (footrot) (Table 2), a greater prevalence of animals in groups G2 and G3 was found in moist season (10,1 and 4,5%, respectively) when compared to dry season (7,0 and 0%, respectively). The prevalence of footrot found in this study in the moist season was very close to the 12.15% found by Queiroz et al. (2022) in the Southeast region of Brazil, and to the 13.69% found by Aguiar et al. (2011) in the semiarid region of Northeastern Brazil. Despite being very distant regions, this similar prevalence at times of the year where humidity prevails, even with Brazil being a country of continental dimension, the challenge is presented in a unique way for a tropical country. Comparing other countries, the prevalence in this work was higher than a study performed by visual examination of 2000 feet from 500 Swedish lambs submitted from six slaughter houses in early September in Sweden (with relatively high temperature and humidity), where feet with score ≥2 of footrot presented prevalence of 5.8%, and Dichelobacter nodosus was found by culture and PCR in 83% and 97% of these affected feet (König; Nyman; De Verdier, 2011). D. nodosus and Fusobacterium necrophorum are found in sheep with footrot in Brazil (Aguiar et al., 2011). They act synergistically causing contagious footrot in sheep and goats. They are gram-negative, immobile, non-spore-forming, anaerobic bacilli (Underwood et al., 2015). F. necrophorum is present in the soil, manure, gastrointestinal tract and hooves of domestic animals. D. nodosus inhabits the skin and hoof of animals with lesions such as granulomas, that serves as a reservoir for the persistence of the agent, contaminating soil and waste, and disseminating the agent in the environment. It rarely remains in the environment for more than about 2 weeks, but excess humidity, waste and organic matter make it easier for the agent to remain in the environment. Some animals may be chronic carriers (Aguiar et al., 2011; Underwood et al., 2015). Overgrowth, hot and humid environments are key elements in transmission.

In a study in Greece with dairy sheep during autumn, however, the prevalence of footrot was of 8.0%, and it increased with age, suggesting that host-related factors and husbandry practices are important determinants of its occurrence, even though authors admit that at the time there was

a wide reduction of the replacement rate and since animals were randomly selected, ewes were greater than four-year-old (Moschovas et al., 2021). In a study with ewes classified in > 4 and ≤ 4 y/o, susceptibility to lameness, but not poor foot conformation, increased with age suggesting some reduction in resistance to footrot (Kaler et al., 2010). In this study, animals with 3.5 to 4.0 y/o (table 3, figure 2), both in Dry and Moist season had G2 (3.8% and 5.0%, respectively) and G3 (0% and 1.7%, respectively) characterization of lesions, while other ages had less or zero prevalence.

Regarding specific foot lesions, double sole and overgrowth, and their association were the most frequent lesions in dry season, while overgrowth was the most frequent lesion in moist season. The hypothesis is that overgrowth may be a sign of chronic footrot, and apparent self-cure is possible particularly in cases where the infection has been confined to the interdigital skin (Raadsma; Egerton, 2013).

In recent study, hind limbs were the most affected and the most frequent diseases were white line disease (40.05%), interdigital dermatitis (33.70%) and footrot (12.15%) (Queiroz et al., 2022). Similarly, Dionizio et al. (2022) and Pozzati et al. (2018), obtained 68% and 82.10% of injuries to the pelvic limbs. In the first article, interdigital dermatitis accounted for 12.40% and in the last article, heel erosions accounted for 18.75% of the total, followed by interdigital dermatitis (14.07%) as the most common conditions.

However, other study in Northeastern Brazil, the highest occurrence of foot lesions was observed in the forelimbs (53.5%) than pelvic limbs (46.5%) (Carvalho et al., 2018). Other study considering only WLD, only 1% of ewes were not affected, and almost three-quarters of sheep-level observations and half of foot-level observations were affected, being back feet the most affected by WLD, and most likely to have both paired claws affected, compared to front feet (Best et al., 2021). In this study, during dry season, considering the total of foot lesions per limb (table 5), prevalence of right and left forelimbs (80.0% and 80.6%, respectively) and right and left hindlimbs (83.1% and 77.5%, respectively), were lower than the prevalence during moist season for respective limbs (97.8%, 99.4%, 97.8% and 97.8%, respectively). Despite this, it was observed that the prevalence of DS and OG+DS lesions between the periods showed differences, with the dry period being the time of highest prevalence for both diseases. It is believed that these differences may be related to the fact that many animals entered the evaluated dry season without regular trimming and/or hoof treatment and, then, with a response to the initial aggression, gradually progressing during the dry season that led, firstly, to a high prevalence of DS in the dry season, and this added to the problems of GO seemed to increase the prevalence of both diseases.

Considering OG (table 5) in dry season, hindlimbs were more affected than forelimbs (58.1%, 55.6% and 45,6%, 47.5%, respectively), but in moist season the prevalence is very close for both hind and forelimbs (88.3%, 84.4% and 87.2% and 89.9%, respectively). Also considering other lesions, differences between limbs are more evident in dry season. Excessive hoof growth represented the third most diagnosed disease, but with only 8.6% of cases. This value may be linked to the fact that half of the farms consulted carried out trimming, even if sporadic. Extreme occurrence values can be found in the literature ranging from 0.5% (Aguiar et al., 2011) to 90% (Tadich; Hernandez, 2000). Overgrowth can lead to serious problems due to: accumulation of soil and moist organic matter, predisposing to pododermatitis, or dried inorganic matter (such as stones) generating traumatic injuries; deformation of the nail with incorrect angulation or twisting of the internal structures, preventing correct support to the ground and the possibility of cracking or rupture of the wall with exposure of the sensitive laminae (Smith et al., 2014).

In a study in the semiarid region of Northeastern Brazil, in the transition of moist to dry season, WLD was found in 3.95% of the animals, sole ulcers in 1.29%, foot abscess in 1.03% and hoof OG in 0.5%, and the general prevalence of foot lesions was 19.41% (170/876) in sheep (Aguiar et al., 2011). In the state of Bahia, also Northeastern region of Brazil, interdigital dermatitis presented a prevalence of 27.7% of the cases, excessive hoof growth 8.6%, white line disease 3.2%, double soles 3.2%, toe granuloma 2.3%, interdigital hyperplasia 2.3%, sole ulcers 0.9% and 0.4% of foot abscess (Carvalho et al., 2018). In this study, WLD was not observed as the only lesion in the limbs examined, and OG was the concomitant finding reaching both a prevalence of 0.3% in dry and 1.4% in moist season.

CONCLUSION

In conclusion, this exploratory study provides key insight into the prevalence of foot lesions of sheep in two distinct seasons, and the occurrence of concomitant lesions. Footrot prevalence was similar to other studies in different regions of Brazil, and animals of all ages were classified as moderate to severe footrot according to the modified Egerton scoring system, during moist season.

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