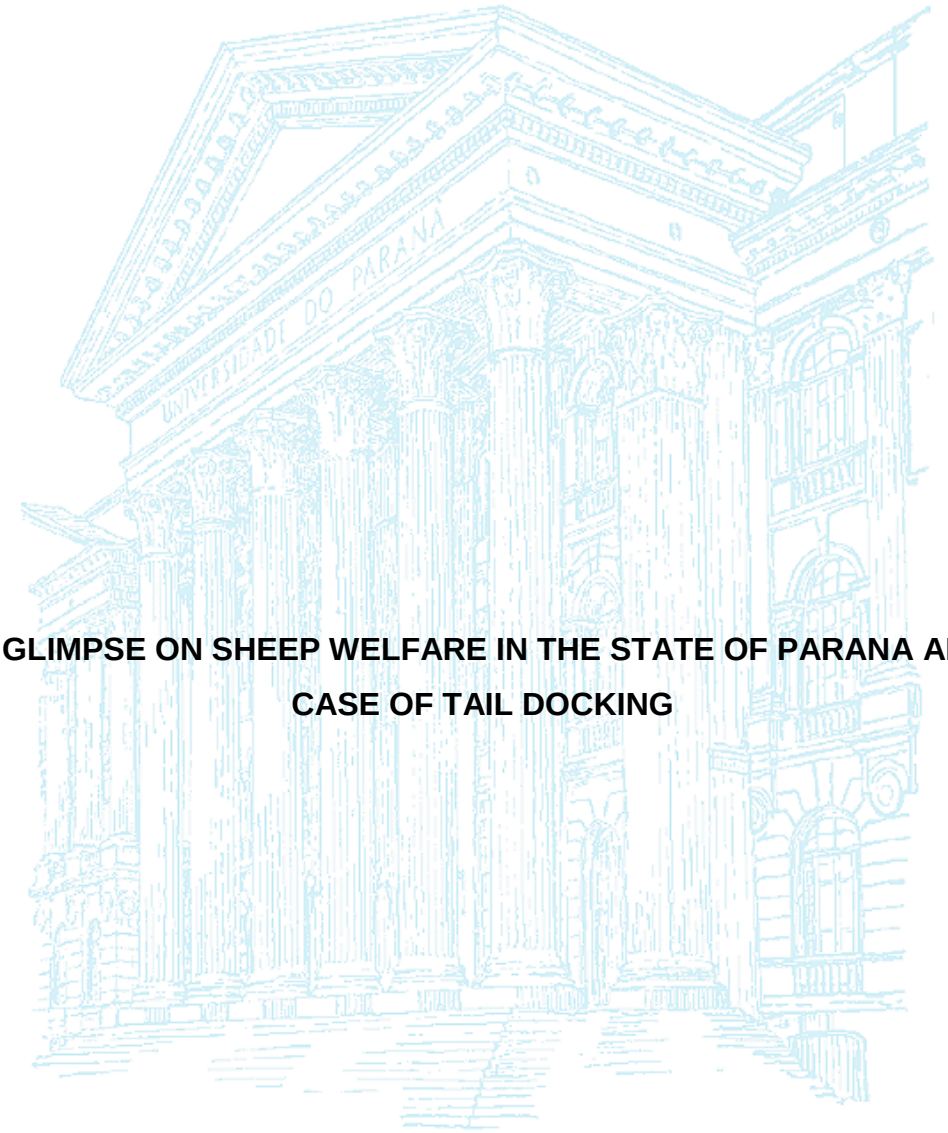
UNIVERSIDADE FEDERAL DO PARANÁ

FABIANA DE ORTE STAMM



FIRST GLIMPSE ON SHEEP WELFARE IN THE STATE OF PARANA AND THE CASE OF TAIL DOCKING

CURITIBA

2016

FABIANA DE ORTE STAMM

FIRST GLIMPSE ON SHEEP WELFARE IN THE STATE OF PARANA AND THE CASE OF TAIL DOCKING

Thesis presented to the Post-Graduation Program in Veterinary Sciences of the Agrarian Sciences Sector of the Federal University of Paraná, as a partial requisite for the obtention of the title of Master in Veterinary Sciences.

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UFPR

PARECER

A Comissão Examinadora da Defesa da Dissertação intitulada **"FIRST GLIMPSE ON SHEEP WELFARE IN THE STATE OF PARANA AND THE CASE OF TAIL DOCKING"** apresentada pela Mestranda **FABIANA DE ORTE STAMM** declara ante os méritos demonstrados pela Candidata, e de acordo com o Art. 79 da Resolução nº 65/09–CEPE/UFPR, que considerou a candidata apta para receber o Título de Mestre em Ciências Veterinárias, na Área de Concentração em Ciências Veterinárias.

Curitiba, 21 de março de 2016

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“*Animals share with us the privilege of having a soul*.”

Pythagoras

RESUMO

No Brasil existem poucos estudos com relação ao bem-estar dos ovinos, portanto, constante avaliação dos animais nas propriedades é necessária para identificar problemas e aprimorar o manejo dos mesmos, promovendo o bem-estar animal (BEA). Um ponto crítico de bem-estar reconhecido na ovinocultura é a caudectomia, procedimento que consiste na remoção da cauda. Não há um consenso na literatura para justificar esse procedimento, e existem evidências científicas de que a caudectomia tem impactos negativos no BEA. O objetivo do presente trabalho foi colaborar para a solução do ponto crítico caudectomia e avançar no conhecimento com relação ao grau de bem-estar de ovinos no Estado do Paraná. Este estudo foi dividido em cinco capítulos: (1) Apresentação; (2) Percepção dos produtores com relação à caudectomia em ovinos e razões para acabar com este procedimento; (3) Escore de sujidade e ocorrência de miíases comparando ovelhas sem e com cauda; (4) Bem-estar de ovinos em cabanhas e em fazendas para produção de carne, avaliado com o protocolo Animal Welfare Indicators (AWIN); (5) Considerações finais. O capítulo 2 teve o objetivo de compreender a percepção dos ovinocultores em relação ao bem-estar de ovinos e procedimentos relativos à caudectomia no estado do Paraná, facilitando a discussão e as implicações em cessar a prática da caudectomia em ovinos. O estudo foi realizado por meio de entrevistas com 146 ovinocultores. Nossos resultados sugerem que os ovinocultores reconhecem que ovinos são animais sencientes e que a caudectomia causa dor. Porém, a maioria dos respondentes cortava a cauda dos animais pelo principal motivo de higiene, e apenas 5,1% utilizavam anestesia. No capítulo 3, foi avaliado o escore de sujidade, ou seja, a matéria fecal aderida à lã na região posterior, e a prevalência de miíase comparando 28 ovelhas sem cauda e 28 ovelhas com cauda em quatro propriedades que criam ovinos no Paraná e em Santa Catarina. Houve diferença no escore de sujidade quando comparadas ovelhas sem e com cauda ($P = 0,0001$), sendo que ovelhas com cauda apresentaram maior sujidade. No entanto a prevalência de miíase foi baixa (0,46%). Considerando os capítulos 2 e 3, devido ao fato de alguns produtores relatarem viabilidade de manter ovelhas lanadas com cauda, baixa prevalência de miíase em rebanhos de ovinos e o sofrimento dos animais, sugere-se a descontinuidade da caudectomia como procedimento no manejo de ovinos. No entanto, nossos resultados sugerem necessidade de estratégias de compensação para limpeza da região posterior após o abandono da prática. O capítulo 4 forneceu informações sobre o bem-estar de ovinos comparando ovelhas criadas em cabanhas e ovelhas criadas para gerar cordeiros para abate, utilizando o protocolo de BEA AWIN. Dezesseis propriedades criadoras de ovinos foram visitadas em 2015, no Paraná. De maneira geral, o BEA foi aparentemente maior em cabanhas considerando características da lã. Espera-se que resultados do presente trabalho encorajem produtores e pessoas que trabalham diretamente com animais a questionarem práticas culturais que afetam o BEA, como a caudectomia, e que exista constante avaliação do bem-estar de ovinos, identificando problemas e aprimorando o manejo desses animais.

Palavras-chave: Caudectomia. Dor. Escore de sujidade. Protocolo de avaliação. Ovelhas.

ABSTRACT

In Brazil there are few studies in relation to sheep welfare, therefore, constant assessment of sheep on farm is necessary to identify problems and improve animals' management, promoting animal welfare. One critical point recognized in sheep farms is tail docking, a procedure that consist in the removal of the tail. There is no consensus in the literature to justify this procedure, and there is scientific evidence that tail docking negatively impacts sheep welfare. Therefore, the objective of the present work was to collaborate to the resolution of the critical point tail docking and to advance the knowledge about sheep welfare in the state of Parana. This study is divided in five chapters: (1) Presentation; (2) Farmer perceptions concerning sheep tail docking and reasons to end this management procedure; (3) Dag score and fly strike prevalence comparing ewes with docked and undocked tail; (4) Sheep welfare in stud and meat farms measured with the Animal Welfare Indicators (AWIN) protocol; (5) Final considerations. Chapter 2 had the objective to better understand farmer perception regarding sheep welfare and procedures concerning the tail docking of sheep in the State of Parana, South of Brazil, to facilitate discussion of this procedure and the implications of ceasing tail docking of sheep. Study was carried out through interviews with 146 sheep farmers. Our results suggest that farmers in Parana recognize that sheep are sentient animals and that tail docking causes pain. However, most of the farmers docked their sheep tails for the main reason of hygiene, and only 5.1% used anesthesia during docking. On chapter 3 it was evaluated dag score, i.e. faecal material adhering to the wool surrounding the breech, and the prevalence of fly strike comparing 28 wool ewes with docked tail and 28 wool ewes with undocked tail in four farms that raise sheep in the States of Parana and Santa Catarina. There was a significant difference in dag score when comparing docked to undocked ewes ($P = 0.0001$), with undocked ewes presenting higher dag score. However, prevalence of fly strike was low (0.46%). Considering chapters 2 and 3, due to the fact that some farmers reported the viability of maintaining wool sheep with undocked tail, the low prevalence of fly strike in sheep flock and the suffering involved, we suggest ceasing tail docking as a regular management procedure for sheep. However, our results suggest necessity of compensation strategies after ceasing of tail docking procedure. Chapter 4 provided information about sheep welfare comparing ewes raised in stud farms and ewes raised to generate lambs for meat purposes, using AWIN protocol. Sixteen sheep farms were visited in 2015, in Parana. Overall welfare seems higher in stud farms considering fleece characteristics. It is hoped that results of the present study encourage farmers and people directly involved to animals to question cultural practices that affect animal welfare, as tail docking in sheep, and to constantly assess sheep welfare, identifying problems and improving sheep management.

Key words: Assessment protocol. Dag score. Ewes. Pain. Tail docking.

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1 PRESENTATION

The number of sheep in Brazil in 2013 was 17 290 519 animals, with a greater representation in the Northeast region (56.5%), followed by the South region (30%) (IBGE, 2013). In the State of Parana, South of Brazil, the number of sheep in 2013 was 640 681 animals, representing 3.7% of the total number of sheep in the country (IBGE, 2013). There are, however, few studies about sheep welfare and no studies employing an assessment using sheep welfare protocol in this country.

There is an increase in demand from consumers for assurance schemes for high quality animal products, in terms of health, safety and respect for animal welfare (CAROPRESE et al., 2015). However, regardless of the growing importance of animal welfare, procedures that cause pain and suffering in small ruminants are still regular practices in the scenario of sheep production. Tail docking is a common procedure carried out in sheep farms in most countries, including Brazil. There are different methods for tail docking, including hot iron, rubber ring, rubber ring combined with clamp, crush and cut, and the surgical method (NATIONAL FARM ANIMAL CARE COUNCIL, 2013). There is evidence that all tail docking methods result in behavioural changes that are indicative of acute pain in sheep (SUTHERLAND; TUCKER, 2011; COCKRAM et al., 2012). Despite of being a common procedure in many countries, further research is required to justify tail docking of sheep as a routine practice (SUTHERLAND; TUCKER, 2011). According to a study done in São Paulo, Brazil, tail amputation practiced by breeders as a hygienic measure did not prevent myiasis by *Cochliomyia hominivorax*; moreover, the lesion resultant from the procedure seemed to favor the establishment of the screw-worm infestation, since animals who suffered tail amputation presented twice the infestation rate of those which did not suffer the procedure (MADEIRA; AMARANTE; PADOVANI, 1998). In a review of the scientific evidence of the reasons for tail docking, two of three studies comparing the effect of tail docking with undocked controls found no reduction on fly strike in docked sheep; therefore further research is required to justify tail docking of sheep as routine practice (SUTHERLAND; TUCKER, 2011).

The objective of the present work was to collaborate to the resolution of the critical point in animal welfare represented by tail docking and to advance knowledge about sheep welfare in Parana State. Results are distributed in chapters 2, 3 and 4.

On chapter 2, the reasons given by sheep farmers for tail docking sheep were studied. Because hygiene was the main reason given by producers for tail docking, the objective of chapter 3 was to evaluate dag score, i.e. faecal material adhering to the wool surrounding the breech, and the prevalence of fly strike in sheep comparing docked and undocked ewes in four farms that raise sheep, three in the State of Parana and one in Santa Catarina. On chapter 4, overall sheep welfare was assessed, comparing ewes raised to generate animals for breeding rams and ewes, i.e. stud farms; and ewes raised to generate lambs for slaughter, i.e. for meat purposes, using Animal Welfare Indicators (AWIN) protocol (2015). Thus, in the last chapter we intend to offer a first view of the sheep welfare state in typical farms in the region Curitiba and Castro, State of Parana, South of Brazil. This work represents the first time sheep farms are assessed using a welfare protocol in Brazil.

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2 FARMER PERCEPTIONS CONCERNING SHEEP TAIL DOCKING AND REASONS TO END THIS MANAGEMENT PROCEDURE

ABSTRACT

Although tail docking is common in sheep, there is no consensus in the literature to justify this procedure. There is scientific evidence that tail docking negatively impacts sheep welfare. The objective of this study was to better understand farmer perception regarding sheep welfare and procedures concerning the tail docking of sheep in the State of Parana, South of Brazil, to facilitate discussion of this procedure and the implications of ceasing tail docking of sheep. The present study was carried out via telephone interviews or personally with 146 sheep farmers. Twenty-eight farmers (19.2%) did not tail dock; the main reasons given not to dock were because they raised haired sheep breed and because they considered tail docking an unnecessary procedure. One hundred and eighteen farmers docked their sheep's tails (80.8%) and the main reason given was hygiene in general (61.0%), which can be controlled with better flock management; facilitated mating (42.4%); breed standards (29.7%) and esthetics (26.3%). That evidences the influence of culture and indicates that a substantial change regarding breed standards is urgently needed in order to reduce unnecessary pain in sheep. Rubber ring was the main method used for tail docking by 82.2% of the farmers in the state of Parana, but the use of anesthesia was waived in most farms, since only six (5.1%) farmers used anesthesia during the procedure of tail docking. Our results show that farmer opinions on sheep tail docking are controversial, as some farmers answered that the occurrence of myiasis is commonest on the tail docking lesion, indicating that this procedure is questionable with regards to its original objective. Due to the lack of evidences to justify tail docking, the fact that some farmers report the viability of maintaining wool sheep with undocked tail and the suffering involved, we suggest ceasing tail docking as a regular management procedure for sheep.

Key words: Animal welfare. Lambs. Pain. Rubber ring.

2.1 INTRODUCTION

Even with the growing consumer concern about the welfare of farm animals (MAYFIELD et al., 2007), there are still some procedures, such as tail docking, that cause pain and suffering in small ruminants. Tail docking is a common procedure carried out in sheep farms in most countries. Among the reasons why a farmer would adopt tail docking, reported in Australia and New Zealand, are decreased urine and faecal soiling or dag formation, and decreased susceptibility to fly strike, which is a painful condition caused by live maggots eating sheep flesh (MORRIS, 2000; SHEEP STANDARDS AND GUIDELINES, 2013). There are different methods for tail docking, including hot iron, rubber ring, rubber ring combined with clamp, crush and cut, and the surgical method (NATIONAL FARM ANIMAL CARE COUNCIL, 2013). According to reviews of scientific research, there is evidence that all tail docking methods result in behavioural changes that are indicative of acute pain in sheep (SUTHERLAND; TUCKER, 2011; COCKRAM et al., 2012).

The tail comprises skin, muscle, bone and nerves; therefore it is expected that any tail damage would be a source of pain to the animal (EDWARDS; BENNETT, 2014). In sheep, the types of pain that could be experienced during and following docking include pain associated with cutting the tail, inflammatory pain, causalgia, defined as persistent severe burning pain following damage to a sensory nerve, phantom-limb pain, pain associated with neuromas, and ascending neuritis (GREGORY, 2004). In a study where lesions were produced by castration and tail docking of lambs with elastrator rings with and without local anaesthetic, the incidence of abnormal lying, abnormal standing and lying idling were higher on lambs castrated and tail docked without local anaesthetic (KENT et al., 2000). Thus, it is clear in the literature that tail docking negatively impacts sheep welfare, since this procedure causes pain and suffering.

Despite of being a common procedure in many countries, such as United Kingdom, Australia, New Zealand, Canada and Brazil (KENT et al., 2000; MORRIS, 2000; SEBRAE, 2009; COCKRAM et al., 2012), further research is required to justify tail docking of sheep as a routine practice (SUTHERLAND; TUCKER, 2011). According to a study done in São Paulo, Brazil, tail amputation practiced by breeders as a hygienic measure did not prevent myiasis by *Cochliomyia hominivorax*; moreover, the procedure resultant lesion seemed to favor the establishment of the

screw-worm infestation since animals, mainly Suffolk and Corriedale sheep, who received tail amputation presented twice the infestation rate of those which did not received the procedure (MADEIRA; AMARANTE; PADOVANI, 1998). In a review of the scientific evidence of the reasons for tail docking, only one of three studies comparing the effect of tail docking with undocked controls found a clear reduction on fly strike in docked sheep (SUTHERLAND; TUCKER, 2011).

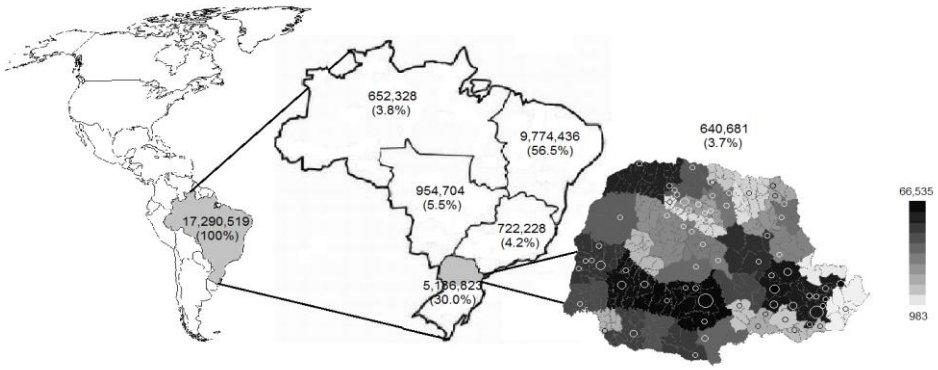
In Brazil, tail docking is largely employed and recommended in guidebooks for sheep production (VAZ, 2007; SEBRAE, 2009; DEMINICIS et al., 2013). According to the Article 5, paragraph 2, of the resolution nº 877 from February 15, 2008 from the Brazilian Federal Council of Veterinary Medicine on surgical procedures in farm and wild animals, tail docking is a forbidden procedure in sheep as any procedure without respect to the regulation of antisepsis, prophylaxis, anesthesia and analgesia (CFMV, 2008). This prohibition was later modified by Annex 2, added on Article 6 from the Resolution nº 928, 2009, that allowed tail docking on wool sheep breeds, previously submitted to anesthesia and analgesia (CFMV, 2009). The present format of the text is supported by the National Farm Animal Care Council (2013) of Canada, which states that it is not necessary to tail dock short-tailed breeds and may not be necessary to tail dock haired breeds. However, this modification of the CFMV resolution in 2009 allowing tail docking of wool breeds is controversial, since there is no consensus on its benefits.

The objective of this study was to better understand farmer perception regarding sheep welfare and procedures concerning the tail docking of sheep in the State of Parana, South of Brazil, to facilitate discussion of this procedure and the implications of ceasing tail docking of sheep.

2.2 MATERIAL AND METHODS

In Brazil, the number of sheep in 2013 was 17 290 519 animals with a greater representation in the Northeast region (56.5%), followed by the South region (30%) (IBGE, 2013). In the State of Parana, South of Brazil (FIGURE 1), the number of sheep in 2013 was 640 681 animals, representing 3.7% of the total number of sheep in the country (IBGE, 2013).

FIGURE 1 - SHEEP PRODUCTION IN BRAZIL, DETAILED BY REGION AND THE STATE OF PARANA ACCORDING TO IBGE (2013); IN THE STATE OF PARANA, DARKER COUNTIES REPRESENT GREATER NUMBERS OF SHEEP; CIRCLES REPRESENT COUNTIES WHERE FARMERS WERE CONTACTED FOR THE PRESENT WORK, LARGER CIRCLES REPRESENT HIGHER NUMBERS OF RESPONDENTS



SOURCE: IBGE (2013); ARTWORK: The author (2015).

The study was carried out via telephone interviews or personally with 200 farmers from October 2014 to July 2015 in the State of Parana, Brazil. The interviews constituted a sample with an margin of error of 7% and a 95% confidence interval from a total of 17 434 sheep farmers in Parana (IBGE, 2006). Farmers were invited to participate via contact details provided by sheep associations and cooperatives and by other farmers. The questionnaire consisted of seventeen questions with close and open formats; two questions about demographic data, three questions about production characteristics, seven on the tail docking procedure, three on farmer perception, and two on general sheep management. The questionnaire is given in Appendix 1.

2.2.1 Statistical analysis of results

Data was analyzed using Minitab Statistical Software version 17. Questions about perceptions of farmers were analyzed using Chi-Square Test for Association to compare gender related opinions. The frequency of infestation by ovine cutaneous myiasis was analyzed using Wilcoxon rank sum test. The reported frequency of infestation was separated into four groups with different scores: frequently (score 3), occasionally (score 2), rarely (score 1) and never (score 0).

2.3 RESULTS

2.3.1 Farm and breed description

From the total farmers contacted, 52 no longer maintained sheep and two farmers quit the interview before answering all the questions. Of the remaining 146 respondents, 123 (84.2%) were men. The main breeds of the sheep raised on their farms were Texel (46.6%, 68/146), Santa Inês (35.6%), Dorper (31.5%) and Ile de France (32.2%); 76 farmers (52.1%) raised more than one breed. Fifty-one (34.9%) farmers kept less than 100 animals, 76 (52.1%) kept 100-499 sheep, 12 (8.2%) kept 500-999 sheep and seven (4.8%) farmers kept more than 1000 sheep. One hundred and twenty four farmers (84.9%) kept their sheep in semi-intensive systems, according to the definition given by EFSA (EUROPEAN FOOD SAFETY AUTHORITY, 2014), since sheep had outdoor access to pastures and were housed during night. Nineteen (13.0%) farmers maintained semi-extensive system, which means that sheep were kept in fenced pastures and were not housed. Three farmers (2.1%) had intensive system, since sheep did not have outdoor access.

2.3.2 Management practices

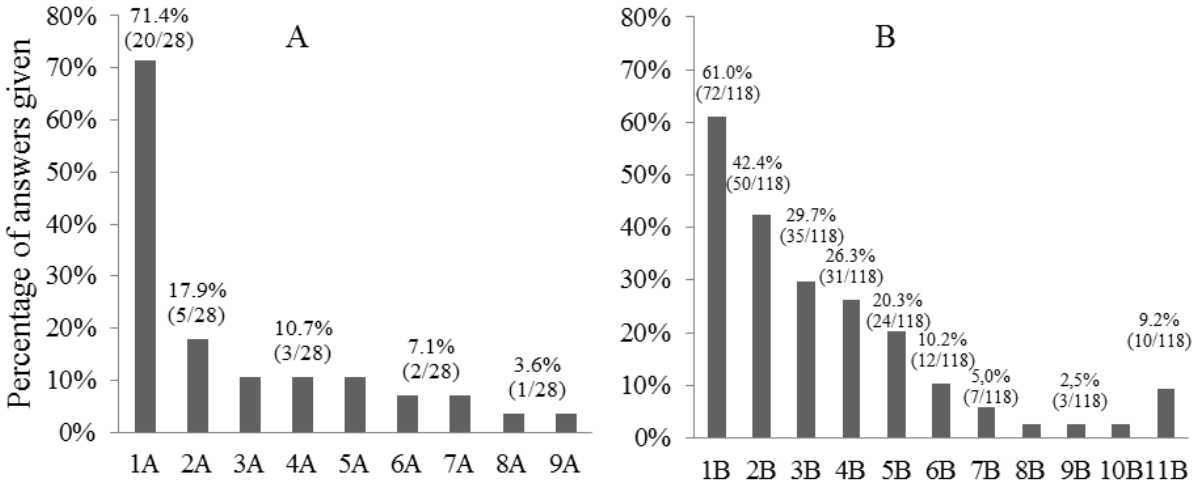
Twenty-eight (19.2%) farmers did not dock their sheep tails. Eleven (39.3%) farmers gave more than one reason not to tail dock (FIGURE 2A). Reasons given were because they raised haired breed (71.4%, 20/28), because it was an unnecessary procedure (17.9%, 5/28), because tail is important to swat flies (10.7%, 3/28), tail docking requires more labor (10.7%, 3/28), tail is a natural part of the sheep (10.7%, 3/28), to avoid pain in sheep (7.1%, 2/28), because of the occurrence of myiasis on the tail docking procedure lesion (7.1%, 2/28), causes stress in sheep (3.6%, 1/28) and because tail docking is going to be a forbidden procedure (3.6%, 1/28).

Considering eight farmers who did not dock wool breed sheep, five used to dock and have changed their attitudes (*Tail docking requires a lot of work, and it is unnecessary. For this reason I stopped docking and I have not seen any difference in the management when comparing sheep with or without tail*). Opinions from these

farmers are important because they have experienced both situations and are in a privileged position to report on tail docking of wool sheep.

One hundred and eighteen farmers docked their sheep tails (80.8%, 118/146) whereas seventy-six (64.4%) farmers gave more than one reason for tail docking. The reasons given to tail docking in sheep (FIGURE 2B) were hygiene in general (61.0%, 72/118), facilitated mating (42.4%, 50/118), breed standard (29.7%, 35/118), esthetics (26.3%, 31/118), hygiene during parturition (20.3%, 24/118), avoidance of dirt in ram's penis during the copulation (5.9%, 7/118), differentiation between rams and ewes (2.5%, 3/118), avoidance of myiasis and worms (2.5%, 3/118), facilitated parturition (2.5%, 3/118), facilitated suckling by the lamb (1.7%, 2/118), tradition (1.7%, 2/118), higher fertility in ewes (1.7%, 2/118), higher acceptance by buyers (1.7%, 2/118), differentiation between purebred and crossbred animals (0.8%, 1/118), facilitated health management (0.8%, 1/118) and because others farmers do it (0.8%, 1/118) (*I do not know why we have to tail dock, but all the other farmers do it, so it must be an important practice*). Twelve (10.2%) farmers docked only for cultural reasons such as breed standard, esthetics and/or tradition, which involved approximately 3,990 sheep (*I think tail docking is unnecessary and I do not like applying rubber ring, but it is the breed standard and if I do not dock, I won't find buyers for my animals*).

FIGURE 2 - REASONS GIVEN NOT TO TAIL DOCK (A) AND TO TAIL DOCK (B) THEIR SHEEP ACCORDING TO 146 FARMERS FROM THE STATE OF PARANA, BRAZIL. MAIN REASONS NOT TO TAIL DOCK: 1A. RAISE HAIRED BREED; 2A. UNNECESSARY; 3A. SWAT FLIES; 4A. DOCKING REQUIRES MORE LABOR; 5A. NATURAL PART OF THE SHEEP; 6A. AVOID PAIN; 7A. OCCURRENCE OF MYIASIS; 8A. CAUSES STRESS; 9A. TAIL DOCKING IS GOING TO BE A FORBIDDEN PROCEDURE. MAIN REASONS GIVEN FOR TAIL DOCKING SHEEP: 1B. HYGIENE IN GENERAL; 2B. FACILITATED MATING; 3B. BREED STANDARD; 4B. ESTHETICS; 5B. HYGIENE DURING THE BIRTH; 6B. ONLY FOR CULTURAL REASONS; 7B. AVOIDANCE OF DIRT IN RAM'S PENIS; 8B. DIFFERENTIATION BETWEEN RAMS AND EWES; 9B. AVOIDANCE OF MYIASIS AND OTHER ECTOPARASITES; 10B. FACILITATED PARTURITION; 11B. OTHER REASONS



Most farmers docked their sheep tails with rubber ring only (82.2%, 97/118), followed by rubber ring with surgical removing of the tail some hours after (5.1%, 6/118), surgical removing with scalpel (5.1%, 6/118), electrical pliers (3.4%, 4/118), hot iron (2.5%, 3/118) and rubber ring with cauterization some hours after (1.7%, 2/118). Only six (5.1%, 6/118) farmers used anesthesia during the procedure of tail docking. Tail docking was done only on male lamb by 3.4% of the farmers who docked, only on female lambs by 31.4% of the farmers and on male and female lambs by 65.2% of the farmers. Docking was done by 30.8% of the farmers who had Santa Inês (native short-haired breed) and by 68.9% of the breeders who had Dorper, although this procedure is only allowed on wool sheep breeds. When asked if injury management was performed after docking, 26 (22.0%) farmers answered that it was not done. Ninety-two (78.0%) farmers took care of their animals after the procedure, including the use of iodine, fly repellent sprays and ointment.

2.3.3 Farmer perception on fly strike

There was no significant difference in the frequency of infestation by myiasis or fly strike reported by farmers between sheep with or without tail (*P* = 0.540) (TABLE 1).

TABLE 1 - INFLUENCE OF SHEEP TAIL DOCKING ON THE FREQUENCY OF INFESTATION BY FLY STRIKE, AS REPORTED BY 146 FARMERS INTERVIEWED FROM OCTOBER 2014 TO JULY 2015 IN THE STATE OF PARANA, BRAZIL

Tail docked	Reported frequency of infestation by fly strike				N	*P*-value
	Frequently	Occasionally	Rarely	Never		
Yes	13 (11.0%)	34 (28.8%)	39 (33.1%)	32 (27.1%)	118	0.5400
No	2 (7.1%)	7 (25.0%)	11 (39.3%)	8 (28.6%)	28	

N= Number of respondents.

Two of the farmers (1.4%, 2/146) answered that fly strike occurred only because of the injury caused by the procedure of tail docking. Hindquarter and breech were the part of the sheep body most affected by myiasis, reported by 20 farmers who dock their sheep tails (16.9%, 20/118) and by two farmers who did not dock (7.1%, 2/28), suggesting that the deprivation of tail may be a factor that prevents sheep to swat flies from the posterior region, inducing infestation by myiasis.

Two farmers said that tetanus is a common problem on sheep docked with rubber ring (*I think that animal welfare is hypocrisy. I do not dock only because I have lost several lambs because of the tetanus caused by rubber ring*). Lewis (2007) described that contamination of docking and castration wounds in lambs when the procedures are carried out in heavily contaminated yards is the commonest cause of tetanus disease, and, frequently, large numbers of lambs succumb.

From 14 farmers who keep both docked and undocked Ile de France, Texel and crossbred ewes, five farmers said that there is no difference in the animal handling and nine farmers said that sheep with a tail require most labor (*Sheep with tail have more urine and faeces accumulated; we have to cut the dirt off with scissors and when these animals have myiasis on the breech, they take off the medicine with the tail*). On the other hand, three farmers who did not dock said that the procedure of tail docking requires most hand labor and they believe that this practice is unnecessary. Three farmers reported that the tail is important for the sheep to swat flies (*If it is the nature of the animal to have a tail, why will we remove it? The tail is there for a reason, for example, to swat flies*).

2.3.4 Farmer perception on animal welfare

There was no significant difference in the perception of the pain (*P*=0.567) and discomfort (*P*=0.183) during tail docking in sheep comparing responses from men and women (TABLE 2). When asked if sheep have the capacity to suffer and experience fear and pain, all 146 farmers answered yes; believing that sheep are sentient beings.

TABLE 2 - PERCEPTION OF PAIN AND DISCOMFORT IN SHEEP DURING TAIL DOCKING AS REPORTED BY 146 FARMERS INTERVIEWED FROM OCTOBER 2014 TO JULY 2015 IN THE STATE OF PARANA, BRAZIL, COMPARING MAN AND WOMEN ANSWERS

Tail docking consequence, number of respondents	Percentage of respondents					*P*-value
	Yes	No	Some animals	Maybe	Did not know	
Pain, 146	80.8	17.1	0.7	0.7	0.7	
Men, 123	81.3	16.3	0.8	0.8	0.8	0.567
Women, 23	78.3	21.7	0.0	0.0	0.0	
Discomfort, 146	88.4	9.6	0.0	2.0	0.0	
Men, 123	90.2	8.1	0.0	1.6	0.0	0.183
Women, 23	78.3	17.4	0.0	4.3	0.0	

2.4 DISCUSSION

2.4.1 Methods used for tail docking

Rubber rings are an easy, cheap and effective method of tail docking young lambs (KENT; MOLONY; GRAHAM, 2001), and that is probably a major factor for the results in terms of the main method used for tail docking by farmers in Parana, Brazil. In the United Kingdom, the rubber ring method has evolved as the method of choice for tail docking of young lambs (MOLONY; KENT, 2007).

In a study in São Paulo, 82.4% of the breeders docked their sheep tails, and the technique most often used for docking was hot iron (by 32.6% of the farmers), followed by rubber ring (26.7%) (MADEIRA; AMARANTE; PADOVANI, 1998). The difference in the technique used to dock in the present study may be due to the fact

that the rubber ring has been popularized in Brazil during the time lapse between Madeira, Amarante and Padovani (1998) and our study. In a study where rubber rings were used for both castration and tail docking, the incidence of active behavior, time spent in abnormal postures and at rest, as well as peak cortisol responses, were all significantly higher than hot iron, *burdizzo* and surgical method (MOLONY; KENT, 1993; KENT; MOLONY; GRAHAM, 2001). Grant (2004) described that husbandry methods, involving the application of tight rubber rings produced large changes in behavioral displays of pain, an increase in the amount of time spent in abnormal postures and greater agitation than treatments not involving rings, although hot iron procedure was the only procedure that consistently produced vocalization in lambs during its application. Although acute physiological and behavioral responses caused by rubber ring or surgery are not as apparent after docking using a hot iron (COCKRAM et al., 2012), the last is not the preferred method of tail docking because of the incidence of subsequent chronic infections (EUROPEAN FOOD SAFETY AUTHORITY, 2014). Therefore, all methods studied, including the rubber ring technique, seem to be problematic in relation to animal welfare, especially considering the very low use of pain control medication according to our results.

2.4.2 Use of pain control and injury management

In a survey about management practices on 242 dairy calf farms in Southern Brazil, only one producer reported the use of a sedative for dehorning, and 3.5% of the farmers for castration; in the remaining farms no methods of pain control were reported (HÖTZEL et al., 2014). Fourteen from 94 cattle farmers from Germany, Italy and France used drugs, sedation or anesthesia during disbudding or dehorning, although many farmers are convinced that these procedures are painful (KLING-EVEILLARD et al., 2015). Thus, although it is recognized that animals feel pain during invasive procedures, the use of anesthesia and analgesia on-farm seems to be low in all studied cases, including the present study.

2.4.3 Farmer perception on sheep sentience and pain

All farmers believed that sheep are sentient beings, having the capacity to suffer and experience fear and pain. In a survey with consumers from Great Britain,

Italy and Sweden, 50, 77, and 56% of the consumers, respectively, answered that farm animal welfare is very important, and almost all the respondents agreed that animals can feel pain (MAYFIELD et al., 2007). Similarly, most of the farmers from the province of Afyonkarahisar, Turkey, believed that sheep are sentient creatures (KILIÇ; BOZKURT, 2013). However, according to the opinion of British hill sheep farmers, most farmers believed that tail docking was either not painful or only minimally painful and 15.8% of farmers stated tail docking was not at all painful (DWYER, 2009), similar to our results, in which 17.1% of respondents stated that tail docking was not painful (TABLE 2).

2.4.4 Reasons given either to tail dock or not

Our results show that farmer opinions on sheep tail docking are controversial (FIGURE 2). The main reason given not to dock sheep tail was because respondents raised haired sheep, which do not accumulate as much dag, urine and faeces on the breech region as wool sheep. Additionally, tail docking is recommended by guidebooks of sheep production only for wool breeds (VAZ, 2007; SEBRAE, 2009). Other reasons not to dock include farmer belief that tail is a natural part of the sheep and tail is important to swat flies. As mentioned by Sutherland and Tucker (2011), negative side effects of tail docking include the inability to use the tail for other purposes, such as fly removal.

Some farmers answered that tail docking requires more labor and the occurrence of myiasis is commonest on the tail docking lesion, indicating that this procedure is questionable with regards to this objective. As indicated in another study, the resultant lesion of tail docking seems to favor the establishment of screw-worm, since 53.3% of the animals whose tails were not amputated were free of screw-worm compared to only 26.7% of the animals subjected to tail docking (MADEIRA; AMARANTE; PADOVANI, 1998). However, despite farmer belief that sheep feel pain during tail docking, most farmers maintain this procedure, which for them is justified for several reasons.

The main reason given to tail docking in the present study was hygiene in general, which could be controlled with better flock management. Methods that are less harmful than tail docking to reduce myiasis, includes selection of resistant sheep to fly strike, genetic manipulation to reduce wool cover and skin wrinkles on the

breech, more frequent shearing, use of insecticide, flytraps and control of diarrhea (MORRIS, 2000; WARE; VIZARD; LEAN, 2000; PHILLIPS, 2009). It has been reported that dag and urine-stained wool are attractive to flies (PHILLIPS, 2009) and therefore to fly strike. However, in Parana, reports by farmers on the frequency of fly strike did not show a significant difference between sheep that had been tail docked and those that had not been tail docked.

The second commonest reason given to tail docking was to facilitate mating, which was also mentioned in some guidelines of sheep production (OSPINA; QUINTERO, 1989; DEMINICIS et al., 2013). However, in a review of the literature about the appropriate length for docking lambs' tails, there were apparently no comprehensive studies of the effects of tail length in relation to any animal production index. Another major finding is that lambing percentage appears not to be affected by tail length (FISHER et al., 2004).

The third and fourth most common reasons to tail dock were breed standard and esthetics, evidencing the influence of local culture impairing animal welfare. Hötzel et al. (2014) described in a survey about management practices on dairy calf farms in Southern Brazil, that farmers justified the choice of practices on convenience, on short-term economic advantages and traditional conventions, rather than technical knowledge or advice. Molony and Kent (2007) reported that some sheep farmers carried out procedures, such as tail docking, as part of an established tradition and may not recognize the need to justify them. Breed standards are a hindrance to improve sheep welfare, once farmers require docked animals for their flocks. Additionally, the reason for docking, in this case, seems to be mainly for esthetics rather than market driven necessity. Thus, a substantial change regarding breed standards is urgently needed in order to reduce unnecessary pain in sheep. In opposition to Brazilian CFMV resolutions (CFMV 2008; CFMV 2009), tail docking is still performed in haired breeds and anesthesia are used by the minority of farmers who did tail dock.

Producing and encouraging the use of painless alternatives is substantial to improve animal welfare. Most of all, it is important to improve knowledge regarding the reasons given for tail docking, to discredit them in case they are not true, taking into consideration the opinion of farmers who do not tail dock their sheep, the scientific knowledge related to the procedure and the ethical imperative of avoiding the infliction of pain and suffering.

2.5 CONCLUSION

Our results suggest that farmers in Parana recognize that sheep are sentient animals and that tail docking causes pain. However, most of the farmers docked their sheep tails for the main reason of hygiene, and most do not use anesthesia during docking. Due to the lack of evidences to justify tail docking, the fact that some farmers report the viability of maintaining wool sheep with undocked tail and the suffering involved, we suggest ceasing tail docking as a regular management procedure for sheep.

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3 DAG SCORE AND FLY STRIKE PREVALENCE COMPARING EWES WITH DOCKED AND UNDOCKED TAIL

ABSTRACT

Tail docking is a common management performed in sheep; however, there is no consensus in the literature that justifies this practice. The main reason given to tail docking is the hygiene of sheep and, consequently, reduced occurrence of fly strike in the breech region. The objective of the present work was to evaluate dag score, i.e. faecal material adhering to the wool surrounding the breech, and the prevalence of fly strike in sheep comparing docked and undocked ewes in four farms that raise sheep, three in the State of Parana and one in Santa Catarina, South of Brazil. The study included twenty-eight wool ewes with short-docked tails and twenty-eight wool ewes with undocked tails. Ewes were evaluated twice a month, between March 2015 and November 2015, in the State of Parana, totalizing 18 assessments, and between July 2015 and February 2016 in the State of Santa Catarina, totalizing 16 assessments. Considering all farms, there was a significant difference in dag score when comparing docked to undocked ewes (P = 0.0001). On one farm in Parana and the farm in Santa Catarina, there was no difference in dag score when comparing docked to undocked ewes, considering all months, and on two farms in Parana there were differences. Dag score median of both docked and undocked ewes during the period of evaluation, considering all the farms, was 2 (1-5). The prevalence of fly strike was low (0.46%), being two occurrences of fly strike in docked ewes and two occurrences in undocked ewes. Considering the pain caused by tail docking in sheep, the low prevalence of fly strike in sheep flock and the contradiction concerning the relation between presence of tail, dag score and fly strike, we suggest ceasing of tail docking. Studies about hygiene monitoring and measures of breech area in wool sheep with undocked tail are important, and our results indicate necessity of compensation strategies after ceasing of tail docking procedure.

Key words: Animal welfare. Docking. Pain.

3.1 INTRODUCTION

Tail docking of lambs is a traditional and routine procedure on many farms and it is widely considered to help reduce the level of faecal soiling, or dag formation, and fly strike (FARM ANIMAL WELFARE COUNCIL, 2008). Dag formation is caused by the adhesion of faecal material to the breech area and dag scores refer to the quantity of faecal material adhering to the wool surrounding the breech and extending down the hind legs (AUSTRALIAN WOOL INNOVATION LIMITED; MEAT AND LIVESTOCK AUSTRALIA, 2007). Among the reasons why farmers adopt tail docking, reported in Australia and New Zealand, are decreasing of dag formation, and decreasing susceptibility to fly strike, which is a painful condition caused by live maggots eating sheep flesh (MORRIS, 2000; SHEEP STANDARDS AND GUIDELINES, 2013). Myiasis is the infestation of living tissue by the larvae of flies from the order Diptera, with cutaneous involvement being the most common place of occurrence. Once in contact with the skin, host's body heat causes the eggs to hatch and the first stage larvae then painlessly burrow into minute skin perforations, follicular openings, or unbroken skin. After larval penetration, erythematous papule develops what later becomes a furuncular-like nodule and a central pore within the lesion allows exposure to air for larval respiration (MCGRAW; TURIANSKY, 2008).

The risk of fly strike to individuals within any flock will depend on factors such as season, climate and location, and various studies in the UK and Australia have demonstrated that tail docking appear to reduce the number of sheep affected (FARM ANIMAL WELFARE COUNCIL, 2008). However, it is unclear when tail docking reduces dag in sheep and the scientific evidence to support the importance of tail docking to prevention fly strike is sparse, since there have been relatively few controlled studies of fly strike in sheep (FARM ANIMAL WELFARE COUNCIL, 2009; SUTHERLAND; TUCKER, 2011). In a review study, Sutherland and Tucker (2011) found that while some studies found increased dagginess scores with relatively longer tails, others found no relationship between tail length and cleanliness and yet others reported more dags and fly strike on sheep with very short tails. Similarly, only one of three experimental studies demonstrated reduced strike in undocked sheep compared to docked controls (SUTHERLAND; TUCKER, 2011). In a Brazilian study, Madeira, Amarante and Padovani (1998) concluded that tail docking, practiced widely by farmers as a hygienic measure, did not control myiasis by *Cochliomyia*

hominivorax in sheep, mainly Suffolk and Corriedale breeds; the resultant lesion of tail docking, however, seemed to favor the establishment of fly strike since the tail docked flocks presented twice the infestation rate of those who did not. According to Waghorn et al. (1999), faecal consistency is the principal factor influencing dag production, being tail length, wool type and length and the physical anatomy of the sheep rear secondary factors. Other characteristics that have influence on dag formation are nutrition, that can alter the consistency of feces and, thereby, influence the number of sheep with high dag scores (DAVIDSON; CHAPLIN; LAIRD, 2006). Therefore, correct nutrition and health management, as the effective deworming and vaccination control of bacteria agents minimizes the incidence of lamb diarrhea.

Besides being a questionable practice from an efficacy point of view, tail docking is painful to animals. There are physiological and behavioural evidences suggesting that tail docking methods are acutely painful to sheep (NATIONAL FARM ANIMAL CARE COUNCIL, 2013). The types of pain that could be experienced during and following docking include pain associated with cutting the tail, inflammatory pain following docking, causalgia, defined as persistent severe burning pain following damage to a sensory nerve, phantom-limb pain, pain associated with neuromas, and ascending neuritis (GREGORY, 2004). According to Molony and Kent (1993), the methods used for tail docking lambs with five, 21 and 42 days produced changes in behaviour, which could be interpreted as evidence for the presence of considerable pain during the first three hours after treatment. Grant (2004), comparing hot iron and rubber ring tail docking practices, concluded that tail docking by hot iron was the only procedure that consistently produced vocalization in lambs during its application; husbandry methods involving the application of rubber rings, however, produced large changes in behavioural displays of pain, an increase in the amount of time spent in abnormal postures and greater agitation than treatments not involving rings. Despite evidences that tail docking is painful for sheep and that responses to pain are reduced when pain relief is provided (SUTHERLAND; TUCKER, 2011), it is known that in most farms pain relief methods are not used. In Brazil, for example, only 5.1% of the farmers interviewed in the State of Parana used anesthesia during the procedure of tail docking in sheep (STAMM; MOLENTO; MOLENTO, unpublished results).

Removal of the tail has the potential to affect many aspects of the anatomy, physiology and behaviour of the animals, farm management and production, as well

as susceptibility to dag formation, urine staining and consequent fly strike; alternatively, it may be that fly strike, health and welfare issues are not readily perceived as being associated with tail length, at least not as readily as is the presence of dags (FISHER et al., 2004). As the tail anchors rectal and reproductive tract musculature, severing these muscles could alter urination, defecation and the ability to undertake behaviours such as tail-wagging (FISHER et al., 2004). Trial results showed that leaving the tail intact had a positive impact on measured total meat yield and leg yield, probably because the presence of tail improves the muscularity of the hindquarter (KERSLAKE; GREEN, 2014a). Another work demonstrated that ewes that experienced tail docking without analgesia when they had 72-96 hours of life showed more frequent postural changes and visible contractions during their parturition than control ewes that received no treatment, suggesting that pain responses during the perinatal period can have long-term implications for animal health and welfare (CLARK et al., 2014). Another factor related to tail docking is the behaviour constraint caused by the absence of the tail. Tails are known to be important in social signaling in some animal species (TUCKER; FRASER; WEARY, 2001), being important to communication between animals and to the expression of emotions.

Since it is possible to conduct useful research and to run profitable farms with little or no fly strike, much of the current management, research and policy on sheep farming is ethically questionable (MORRIS, 2000). Besides, studies about dag score and fly strike were made in Australia, New Zealand, United Kingdom and United States with local breeds (WAGHORN et al., 1999; FISHER et al., 2004; FARM ANIMAL WELFARE COUNCIL, 2008). According to Scobie et al. (2008), dag score recorded on a 0-5 scale was different comparing breeds, with mean dag score more pronounced in traditional Romney breed than in mixed East Friesian and Texel lambs; and Perendales were more daggy than mixed lambs and differences observed were due to negative correlation between breech bareness and dag scores in studied breeds. Kerslake and Green (2014b), in New Zealand, also found that lamb breed had an effect on dag score at weaning, with Coopworth/Texel cross having a lowest score than Coopworth/Suffolk/Texel cross or Coopworth/Texel/South Down cross, but there was no effect post-weaning.

In Brazil, according to farmer perceptions, main reasons given to tail docking was hygiene in general (61.0%), facilitated mating (42.4%), breed standards (29.7%)

and esthetics (26.3%) (STAMM; MOLENTO; MOLENTO, unpublished results). There are, however, no studies comparing dag score and the prevalence of fly strike between sheep with docked and undocked tails in Brazil. Thus, the objective of the present study was to evaluate dag score and the prevalence of fly strike comparing docked and undocked ewes in four farms in the South of Brazil, three in the State of Parana and one in Santa Catarina.

3.2 MATERIAL AND METHODS

The current study included twenty-eight wool ewes with short-docked tails and twenty-eight wool ewes with undocked tails kept at four farms, three in the State of Parana and one in the state of Santa Catarina (TABLE 3). As on-farm animals, the general management of the ewes had differences in nutrition and time spent outdoor; however, all farms were characterized as semi-intensive (EUROPEAN FOOD SAFETY AUTHORITY, 2014), as all ewes had access to pasture during the day and were housed at night. Ewes in the State of Parana were evaluated between March 2015 and November 2015, twice a month, totalizing 18 assessments, and ewes in the State of Santa Catarina were evaluated between July 2015 and February 2016, twice a month, totalizing 16 assessments. Assessments were made by two observers, one in Parana and one in Santa Catarina.

TABLE 3 - CHARACTERISTICS OF THE FARMS WHERE EWES INVOLVED IN THE EVALUATION OF DAG SCORE BETWEEN MARCH 2015 AND FEBRUARY 2016 IN SOUTHERN BRAZIL, WERE RAISED

Farm	State	Town	Breed	Number of ewes evaluated
1	Parana	Balsa Nova	Mixed breed including Ile de France and Texel	20
2	Parana	Pinhais	Mixed breed Suffolk and White Dorper	8
3	Parana	São José dos Pinhais	Mixed breed including Ile de France	16
4	Santa Catarina	Lages	Crioula	12

Dagginess was evaluated with scores from 1 to 5. Score 1 was given when no faecal soiling was present, score 2 for a small quantity of faecal matter in the wool around the anus, score 3 for some soling around the anus and dags in this area only, score 4 for soiling and dags extending beyond the anus to the tail and onto the upper part of the legs, and a score 5 for a wider area of soiling, with dags extending down the legs as far as the hocks (AWIN, 2015) (FIGURE 3). Undocked ewes also had their tails evaluated, with a score of 1 to 4. An animal with tail score 1 had no faecal soiling on the tail, for tail score 2 animals had small quantities of faecal matter not exceeding half of the tail, for tail score 3 animals had faecal matter exceeding half of the tail but not extending to the entire tail, and for tail score 4 animals had faecal matter on the entire tail.

FIGURE 3 - DAG SCORE USED TO EVALUATE EWES IN THREE FARMS OF THE STATE OF PARANA AND ONE FARM IN SANTA CATARINA, BRAZIL, BETWEEN MARCH 2015 AND FEBRUARY 2016

SOURCE: The author (2015).

Three undocked ewes were removed from the flock, having only nine, eleven and eleven evaluations each. On Farm 3, some ewes with accumulated dag had their breech wool cut to reduce dag, as regular farm management. This management was made in ewes with docked tail in assessment 14 and it was made in ewes with undocked tail in assessment 12 and 16. In farm 4, all ewes had their breech sheared between assessment six and seven. Ewes were completely sheared between assessment 13 and 14 in the Farm 2, between assessment 17 and 18 in Farms 1 and 3, and between assessment 11 and 12 in Farm 4.

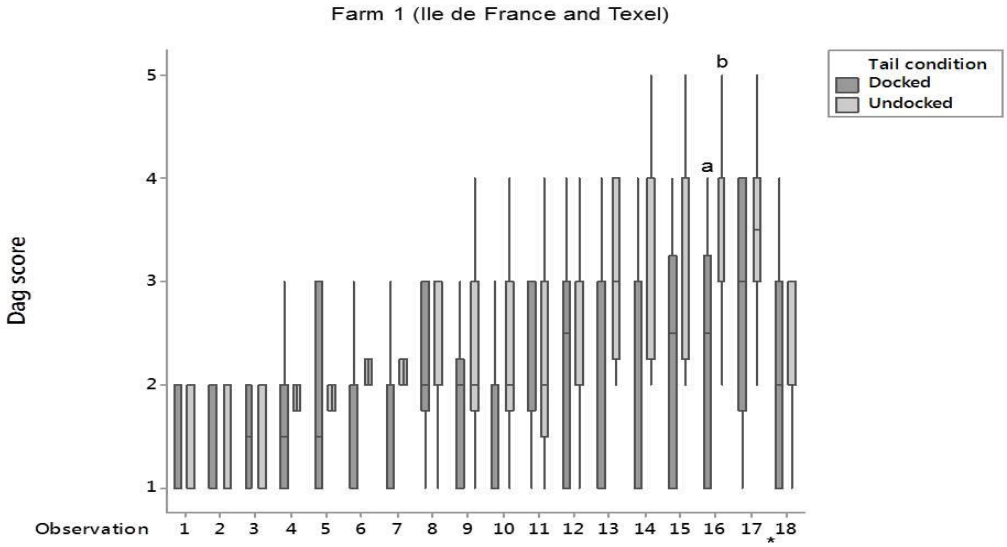
3.2.1 Statistical analysis of results

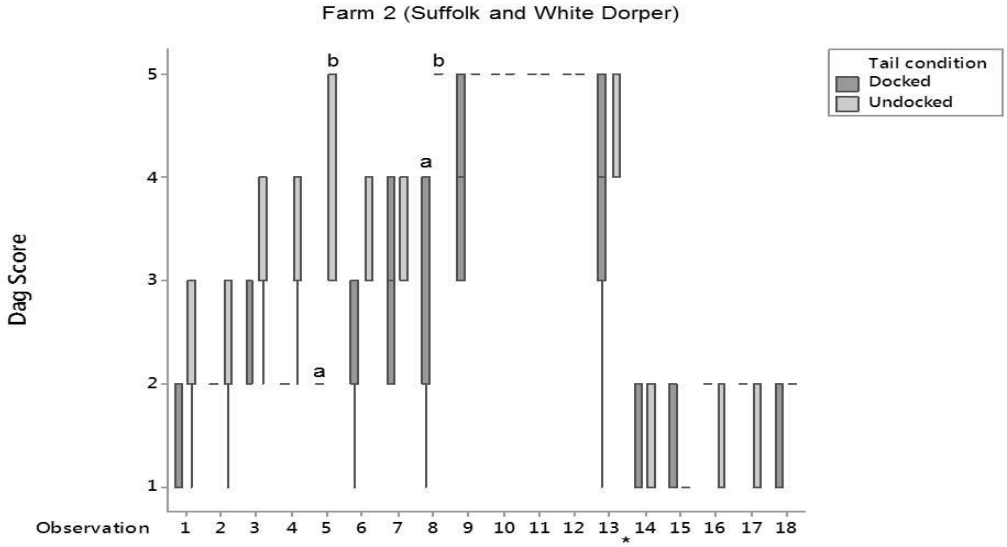
Data was analyzed using Minitab Statistical Software version 17. Docked and undocked ewes, as well as farm differences in dag score were analyzed using Mann-Whitney test, with a confidence level of 95%.

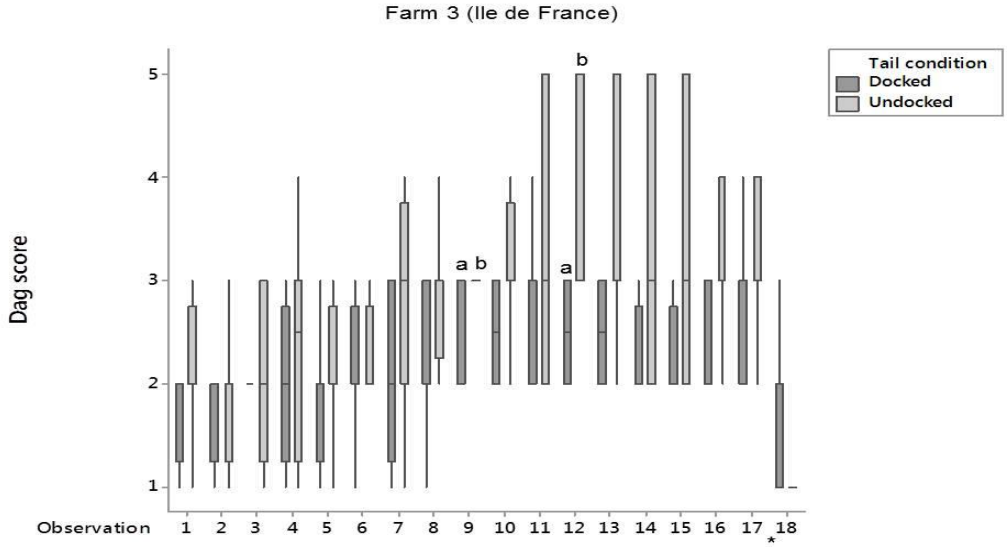
3.3 RESULTS

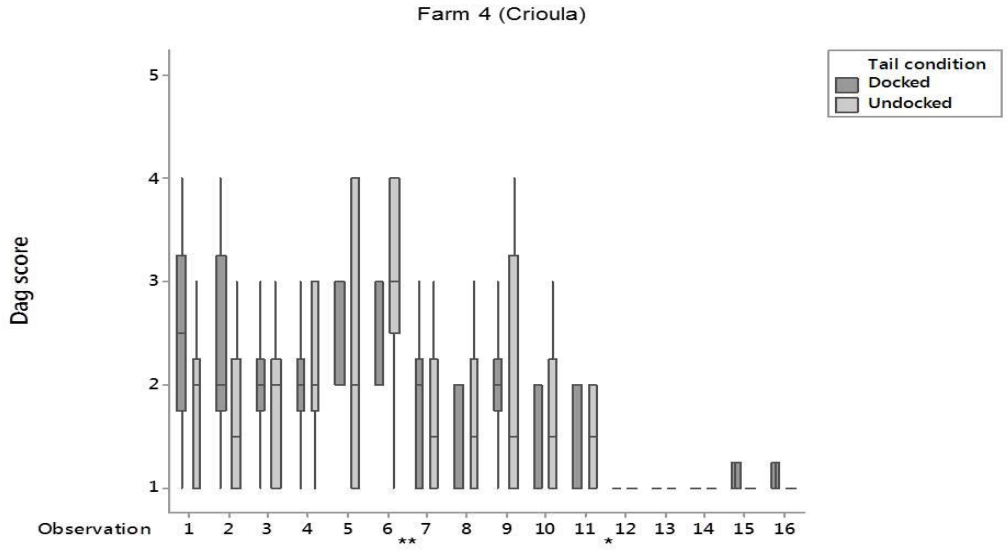
Considering all farms, there was significant difference in dag score when comparing docked and undocked ewes (P = 0.0001). There were, however, differences between farms. On one farm in Parana and the farm in Santa Catarina, there was no difference in the dag score when comparing docked and undocked ewes considering all months; on the other two farms in Parana there were differences (TABLE 4). Dag score results were analyzed over time and are presented in Figure 4, showing that there were observed differences between docked and undocked ewes when compared dag score month after month in Farms 1, 2 and 3, with undocked ewes presenting higher dag score median. In Farm 4, there was no statistical difference in dag score between docked and undocked ewes in any month.

FIGURE 4 - EVOLUTION OF DAG SCORE IN SHEEP OVER TIME, COMPARING DOCKED AND UNDOCKED EWES, FROM ASSESSED FARMS; EWES WERE EVALUATED TWICE A MONTH BETWEEN MARCH 2015 AND NOVEMBER 2015, IN PARANA STATE (FARM 1, FARM 2 AND FARM 3), AND BETWEEN JULY 2015 AND FEBRUARY 2016, IN SANTA CATARINA STATE (FARM 4), BRAZIL, TOTALIZING 18 AND 16 EVALUATIONS, RESPECTIVELY; * EWES WERE COMPLETELY SHEARED; ** EWES HAD THEIR BREECH SHEARED. DIFFERENT LETTERS INDICATE STATISTICAL DIFFERENCES IN MEDIAN SCORES FOR MANN-WHITNEY TEST (P < 0.05)


Farm 1 (Ile de France and Texel)
Tail condition
Docked
Undocked
Dag score
Observation
a
b


Farm 2 (Suffolk and White Dorper)
Tail condition
Docked
Undocked
Dag Score
Observation
a
b


Farm 3 (Ile de France)
Tail condition
Docked
Undocked
Dag score
Observation
a b
a
b



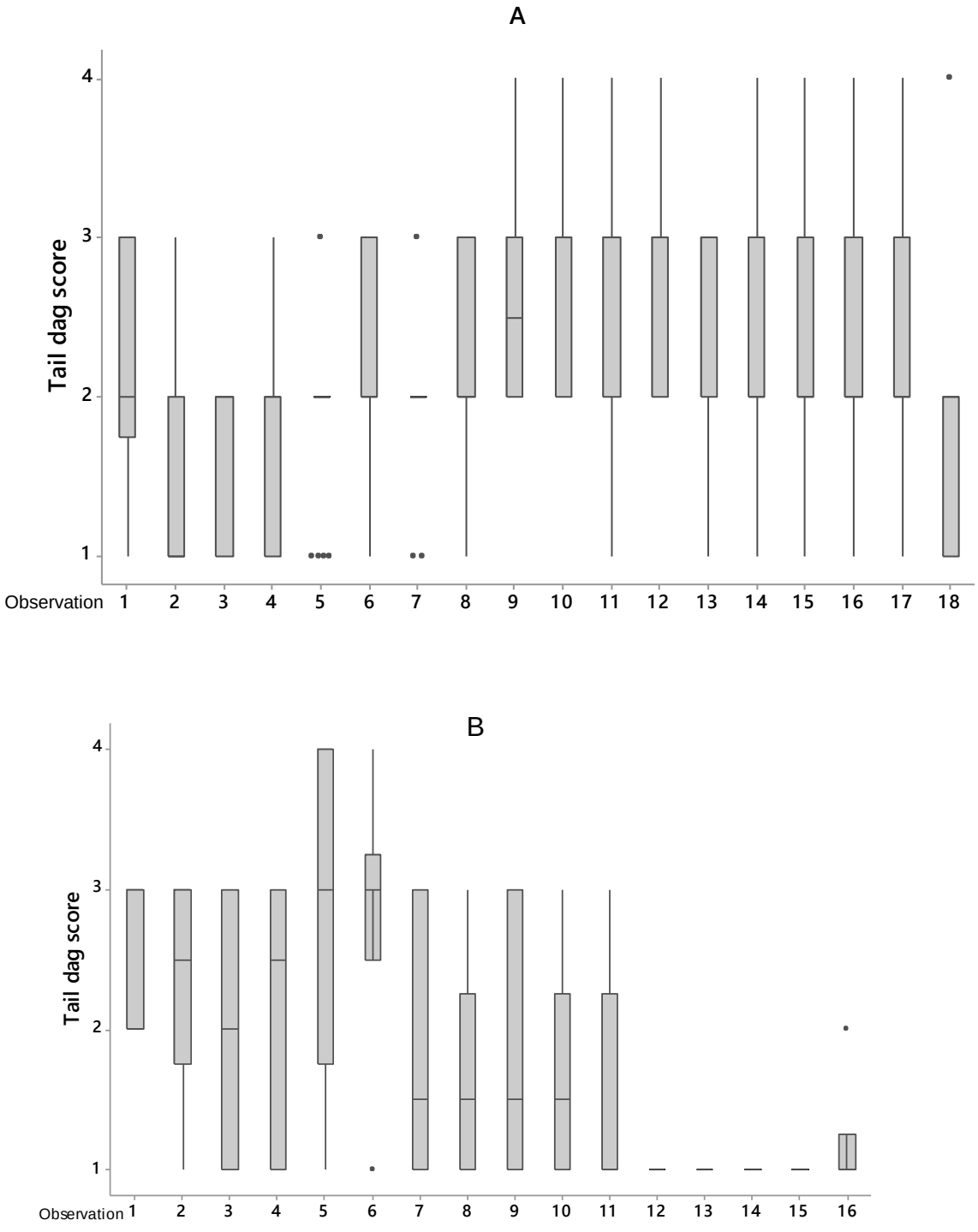
SOURCE: The author (2016).

Dag score medians comparing docked and undocked ewes for each participant farm is represented in Table 4. Dag score median from the tail in undocked ewes are presented in Figure 5.

TABLE 4 - DAG SCORE IN SHEEP RAISED IN THE SAME FARM COMPARING EWES WITH DOCKED AND UNDOCKED TAIL, BETWEEN MARCH 2015 AND FEBRUARY 2016, IN BRAZIL

Farm	Tail condition	Dag score median	P-value
1	Docked	2 (1-4)	0.0007
	Undocked	2 (1-5)	
2	Docked	2 (1-5)	0.0936
	Undocked	3 (1-5)	
3	Docked	2 (1-4)	0.0001
	Undocked	3 (1-5)	
4	Docked	2 (1-4)	0.2623
	Undocked	2 (1-4)	

FIGURE 5 - EVOLUTION OF THE TAIL DAG SCORE IN UNDOCKED EWES OVER TIME, CONSIDERING FARMS 1, 2 AND 3 TOGETHER, HAVING THE EWES BEEN EVALUATED TWICE A MONTH BETWEEN MARCH 2015 AND NOVEMBER 2015 IN THE STATE OF PARANA, BRAZIL, TOTALIZING 18 EVALUATIONS (A); AND IN FARM 4, BETWEEN JULY 2015 AND FEBRUARY 2016 IN THE STATE OF SANTA CATARINA, BRAZIL, TOTALIZING 16 ASSESSMENT (B). OUTLIERS ARE REPRESENTED AS *



SOURCE: The author (2015).

The prevalence of fly strike was low (0.46%). There were two occurrences in docked ewes, one on the anus and another on the posterior region of the leg; and two occurrences of fly strike in undocked ewes one on the vulva and another on the posterior region of the leg, in May, October, July and November, respectively.

3.4 DISCUSSION

3.4.1 Dagginess in sheep

Differences in dag scores observed between farms, considering all months, are logically due to other variables that affect dag score besides tail length. The length of wool influences dirt accumulation in the perineal region, and shearing this region more frequently can reduce the incidence of faecal soiling, as demonstrated in the present work, where dag score median reduced after excessive dag was cut, in Farm 3, and also after ewes were sheared in all farms. Shearing ewes becomes even more important in the pre pubertal females facilitating the first lamb feeding. There are reports that shearing sheep before parturition also increases the birth weight of lamb and can thus reduce lambs mortality (RIBEIRO; BRITO; MATTOS, 2010).

It was not observed differences in dag score, considering all months, between docked and undocked ewes on Farm 2, but this may have occurred because of the smaller number of evaluated ewes in this farm, once the median of the dag score observed was higher in ewes with undocked tail, despite statistically there was no difference. Local wool breed in Farm 4 also presented no difference, even when compared dag score month after month, probably because of the wool characteristics, being smooth or slightly wavy. Ewes in Farm 4 also had their breech sheared between assessments six and seven, and was the only farm that did this management, which can explain the similar dag score when compared ewes with docked and undocked tail. Similar to Farms 1 and 3, Kerslake and Green (2014b) found that during all post-weaning events, wool lambs with intact tails had a greater dag score than those with docked tail.

Alternatives methods to avoid tail docking include genetic studies as the introduction of quantitative genes with the aim of the reduction of tail length in sheep (SCOBIE; O'CONNELL, 2002), increased area of bare skin in the perineal area and reduced wool cover on and near the tail (HATCHER; PRESTON, 2015). Therefore, breeding improvement in order to eliminate the need for tail docking is slow but it is a definite strategy to ban tail docking in sheep.

3.4.2 Occurrence of fly strike

Similar to our results, the prevalence of fly strike in the study of Kerslake and Green (2014a) was low (0.3%), making it impossible to understand the effect of tail length on the prevalence of fly strike (KERSLAKE; GREEN, 2014b). In São Paulo State, Brazil, Amarante et al. (1992) described that tail myiasis was only observed in animals that had been docked, with 30 occurrences in 194 animals (15.4%), mainly from September to December. In a study of skin diseases in sheep in the semiarid of the states of Paraíba, Pernambuco and Rio Grande do Norte, Northeastern Brazil from January 2000 to November 2006, the occurrence of myiasis was 2.2% in total of 324 sheep, with 55.5 % of this cases occurring during the rainy season (MACÊDO et al., 2008), as observed in our study, in which two fly strike occurrences (50%) happened between September and November, the spring season with high precipitation, with mean of 241 and 275 mm per month in Curitiba and Lages, respectively (INMET, 2015). According to the Farm Animal Welfare Council (2008), a survey of flocks in England and Wales reported that 1.6% of sheep in flocks were affected by fly strike. In another study of fly strike on seven farms in England, the prevalence of fly strike was 1.4% in docked and 6.9% in undocked lambs; the researchers responsible for this work raised the possibility that although lambs with undocked tails appeared to be at greater risk of strike, it is possible that the overall flock prevalence may be unaffected because female blowflies may select the best hosts within a flock on which to lay their eggs (FARM ANIMAL WELFARE COUNCIL, 2008). Duarte et al. (2012) investigated cutaneous myiasis in 10 sheep herds during one year in northern Minas Gerais, Brazil, and they found that myiasis was not correctly treated by the farmers, but after implantation of a correct therapy, 92% of the lesions presented cured within 7 to 30 days. These results show the importance of preventive strategies based on the predisposing factors identified in this study, as the constant inspection, that should be routine especially at the end of rainy season and when predisposing factors are present (DUARTE et al., 2012). According to Waghorn et al. (1999) some New Zealand organic sheep farmers informed that fly strike rate in their farms was considerably lower than that of other farmers because they made continual monitoring of animals. Therefore, myiasis can be controlled through daily inspection of the flock that would help in the identification and treatment of injured animals.

Tools to control flies, such as fly traps, insecticide (BROUGHAN; WALL, 2006), fly genetics strategies using sterile insect technique (LI et al., 2014), stable cleaning chores and biological control (KASSAB et al., 2012) and select of sheep for resistance to fly strike, using an immunological test (WAGHORN et al., 1999) can be used. Alternatives to tail docking are important not only because they can avoid pain in sheep, but also because as a natural part of the animal, tail is important to animals. As mentioned by Sutherland and Tucker (2011), a negative side effect of tail docking include the inability to use the tail for other purposes, such as fly removal. Considering the low occurrence of fly strike in the posterior region of sheep as observed in other researches and in our results, justifying tail docking as a method to reduce myiasis does not seem to be acceptable and alternatives to this practice are important to avoid unnecessary pain in sheep. Changes concerning the tail docking culture are necessary, mainly between sheep famers that are directly involved with the management of these animals. According to Martin-Collado et al. (2015) if a change in tail docking practice was ever required, the perceived impact of making this change would not be the same for all farmers, being required different education programs to address the different concerns that farmers have about farm performance characteristics associated with tail docking practice decisions.

3.5 CONCLUSION

Considering that, in general, there was no difference in dag score when comparing docked to undocked ewes on two farms and there was difference on two farms, considering the low prevalence of fly strike in sheep flock and the pain caused by tail docking in sheep, we suggest ceasing of tail docking. Studies about hygiene monitoring and measures of breech area in wool sheep with undocked tail are important, and our results indicate necessity of compensation strategies after ceasing of tail docking procedure.

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4 SHEEP WELFARE IN STUD AND MEAT FARMS MEASURED WITH THE AWIN PROTOCOL

ABSTRACT

In order to assess animal welfare on farm, scientists have developed protocols for different animal species, including sheep. Considering the lack of information about sheep welfare in Brazil, the objective of the present work was to assess the welfare of this animal species, comparing ewes raised to generate lambs for breeding rams and ewes, i.e. stud farms; and ewes raised to generate lambs for slaughter, i.e. meat purposes. Sixteen sheep farms were assessed between September and December 2015, in the metropolitan region of Curitiba and Castro, in the East region of Parana, using AWIN (Animal Welfare Indicators) protocol. Results were compared with Mann-Whitney test at 0.05. No differences were observed for indicators within good feeding and appropriate behaviour principles. Ewes from stud farms presented less fleece loss and faecal soiling, better fleece cleanliness and more lesions to body, probably because the more frequent shearing realized in ewes from stud farms and the use of predominantly wool-blood ewes for meat purposes. Lesions to head, which were related to tears caused by ear tag, was more frequent in ewes for meat purposes. Results suggest that main characteristics which reduce the degree of sheep welfare in the State of Parana are hoof overgrowth occurrence, lesions to body and head, ocular and nasal discharge and pain induced by management procedures, in this case, tail docking. We were able to identify main welfare restrictions in both stud and meat farms; overall welfare seems higher in stud farms considering fleece characteristics.

Key words: Animal based measures. Animal welfare. Assessment protocol. Ewes. Welfare indicators.

4.1 INTRODUCTION

The number of sheep in Brazil in 2013 was 17 290 519 animals with greater representation in the Northeast region (56.5%), followed by the South region (30%) (IBGE, 2013). In the State of Parana, South of Brazil, the number of sheep in 2013 was 640 681 animals, representing 3.7% of the total number of sheep in the country (IBGE, 2013). In Brazil, the sheep production chain includes farms that raise sheep to produce breeding rams and ewes, i.e. stud farms; and farms that raise sheep to generate lambs for meat. There are also other purposes, such as wool, milk and environmental management; however, these exist in low scale in the state of Parana. Even with the numerous sheep population in Brazil, there are no studies about sheep welfare assessment in this country.

Although the welfare of farm animals has been of concern for more than 40 years, studies about animal welfare has concentrated on those species intensively farmed, mostly pigs and poultry; and species traditionally managed extensively, such as sheep, have received relatively little attention from a welfare perspective (DWYER, 2009). However, animal welfare is a growing science for all animal species, and is important for different reasons: consumer concern (MAYFIELD et al., 2007), moral responsibility for the care of sentient animals that are used (WEBSTER, 2006) and the relationship between production and some animal welfare problems (BOKKO; CHAUDHARI, 2001; CAROPRESE et al., 2006; NAPOLITANO et al., 2006; MARAI et al., 2007; PEIXOTO; MOTA; COSTA, 2010).

There is a growing importance of animal welfare, resulting in increasing in market demand from consumers for assurance schemes for high quality animal products, in terms of health, safety and respect for animal welfare (CAROPRESE et al., 2015) and also for moral considerations to animals (SINGER, 1975; WEBSTER, 2006). According to Molento (2005), farm animal production is intrinsically related to economy, however efforts in the direction of good management practices may be expanded to include factors such as satisfaction and tranquillity that consumers get when buying a product originated from a sentient being that has been treated with respect.

In this context, animal welfare assessment is essential. Valid welfare indicators are required nationally and internationally by farmers, veterinary surgeons, the sheep industry and farm inspectors, in order to measure and monitor on-farm

welfare standards for benchmarking, certification, farm assurance and legal purposes (PHYTHIAN et al., 2011). The evaluation of farm animal welfare may be done by monitoring conditions of the systems, focusing on good human-animal relationship, management and flock health, conditions of installations and environment, with a possible improvement in quality of the final product (CAROPRESE et al., 2009). Good indicators are simple, easy to interpret and apply in farm routine; valid and reliable for animal welfare assessment (FARM ANIMAL WELFARE COUNCIL, 2009). In order to assess animal welfare at farm level, it is also crucial to develop and use animal-based measures, that provide a more accurate welfare assessment (AWIN, 2015).

A recognized protocol for animal welfare assessment is the Welfare Quality®, which was created for pigs, broilers, laying hens and cattle (WELFARE QUALITY ®, 2009). The Animal Welfare Indicators (AWIN) project, in 2011, has developed animal welfare assessment protocols for sheep, goats, horses, donkeys and turkeys (AWIN, 2015). The specific AWIN protocol for sheep assesses the welfare of adult female sheep, older than one year, is focused on animals used to produce meat or milk, and may be applied in intensive, semi-intensive, semi-extensive and extensive systems (AWIN, 2015).

Considering the lack of information about sheep welfare in Brazil, the objective of this work was to assess the welfare of sheep, comparing ewes from stud farms and for meat purposes in the East region of Parana, Brazil, using the AWIN protocol.

4.2 MATERIAL AND METHODS

A total of 16 sheep farms were visited during spring, between September and December 2015, on either morning or afternoon periods, in the metropolitan region of Curitiba and Castro, Parana. Six farms raised sheep mainly for breeding purposes, eight raised sheep mainly for meat purposes, one farm raised sheep for meat and breeding purposes and one farm raised sheep for meat and environmental management. Animals were divided into two groups, according to their main purpose: ewes raised to generate lambs for breeding rams and ewes, i.e. stud farms (S) and ewes raised to generate lambs for slaughter, i.e. for meat purposes (M). On the farm that raised sheep for meat and breeding purposes, ewes were raised separated in

two groups according to their purpose and the assessment was made also separately; thus, part of the data from this farm was considered as a S farm and the other part as an M farm. The farm that raised sheep for meat and environmental management was considered as an M farm. The same person performed the assessment in all farms.

The protocol is divided into two levels of assessment of the welfare (AWIN, 2015). At the first level, a quick screening, consisting of a selection of robust and feasible animal-based indicators, is applied. It is necessary to sample sub-groups of sheep across the different animal management and at this level animals are not handled, only observed. On the second level, animal subgroups should be chosen and the evaluator enters the stall or paddock and a sample of animals according to the total number of ewes on farm, as recommended by AWIN (2015), should be inspected individually. For the present work, the minimum sample size was used (TABLE 5).

TABLE 5 - NUMBER OF EWES SAMPLED ACCORDING TO THE TOTAL NUMBER OF ADULT EWES ON THE FARM, CONSIDERING A MINIMUM SAMPLE, ASSUMING A 50% PREVALENCE, INFORMATION COEFFICIENT 90% AND ACCURACY 10%, ACCORDING TO THE TABLE PRESENTED IN THE AWIN PROTOCOL (AWIN, 2015) AND EWES BREED

Farm	Number of adult ewes on farm	Number of ewes sub-groups	Number of evaluated ewes for the first level assessment	Number of evaluated ewes for the second level assessment	Evaluated ewes breed	Ewes purpose
1	20	1	20	16	Suffolk	M
2	26	1	26	19	Ile de France	M
3	28	1	28	19	Suffolk, Texel, Mixed	M
4	30	1	30	21	Santa Inês	M
5	40	2	40	24	Dorper, Texel, White Dorper	S
6	50	2	33	21	Texel	M
7	50	2	50	24	Dorper, Ile de France, Texel	S
8	52	1	52	29	Texel	M
9	59	1	59	29	Texel	M
10	68	1	68	32	Ile de France, Santa Inês, Suffolk, Texel	M
11	120	4	115	26	Suffolk, White Dorper	S
12	150	3	108	29	Santa Inês, Texel	S
13	300	5	144	32	Texel	S
14	331	3	139	29	Texel	S
15	350	2	350	44	Ile de France, Suffolk, Texel	M
16	800	6	120	-	Dorper, Texel	S
17	1000	3	164	37	Texel	M

After the application of the direct animal evaluation, general information about the farm was collected through an interview with the farm manager, including information regarding lamb mortality, which was calculated using the records of the number of born and dead lambs on the farm. Assessment was performed using the AWIN protocol for sheep (AWIN, 2015) which is organized in four welfare principles (TABLE 6).

TABLE 6 - AWIN WELFARE INDICATORS FOR SHEEP, LISTED ACCORDING TO WELFARE QUALITY® PRINCIPLES AND CRITERIA AND METHODS TO SCORE INDICATORS

(to be continued)

Principle	Criteria	Welfare indicators	Method
Good feeding	Appropriate nutrition	Body condition score	Palpation of the spine
		Lamb mortality	Records of the number of born and dead lambs
	Absence of prolonged thirst	Water availability	Presence, accessibility and cleanliness of water sources
Good housing	Comfort around resting	Fleece cleanliness	Visual inspection of fleece
	Thermal comfort	Panting	Number of ewes with a respiration rate above 30 breaths/min with a closed mouth (mild heat stress) or with open mouthed (panting)
		Access to shade/shelter (outdoor animals only)	Scored as present or absent
	Ease of movement	Stocking density	Measure of the width and length of the pen; dimension was considered good when ewes without lambs had at least 1.5 m² each, adequate when ewes had less than 1.5 m² but more than 1 m² each and poor when ewes had 1 m² each or less; each ewe with lambs at foot should have 0.5 m² higher than dimensions for ewes without lambs
		Hoof overgrowth	At least one hoof is scored as overgrown; for this study, hoof overgrowth was divided in two categories: minor overgrown, in which ewes did not have appropriate hooves shape and had minor overgrown; and major overgrowth, when ewes presented an excessive hoof overgrowth
Good health	Absence of injuries	Body and head lesions	Considered lesions larger than 1x2 cm area or more than 4 cm length for linear lesions
		Leg injuries	Presence of calluses or lesions

(conclusion)

Principle	Criteria	Welfare indicators	Method
Good health	Absence of disease	Lameness	Observation of an abnormality of movement whilst the animal is in motion
		Faecal soiling	Assessment of rear end of the animal and the degree of faecal soiling to the wool around the anus and tail is assessed
		Mucosa colour	The bottom eyelid is carefully pulled a little way down to expose the mucosa
		Ocular discharge	Inspection of the eyes to record the presence or absence of ocular discharge
		Mastitis and udder lesions	Palpation of the udder
		Respiratory quality	Presence of any signs of audible breathing, persistent coughing or nasal discharge should be scored as respiratory problems
		Fleece loss	Relative to Fleece quality in AWIN. Visual inspection of fleece
	Absence of pain and pain induced by management procedures	Tail length	Visual inspection of tail length
Appropriate behaviour	Expression of social behaviours	Social withdrawal	Record of total number of animals that are apart from the rest of the social group
		Stereotypy	Record of total number of animals showing signs of repetitive pacing, star-gazing or wool pulling
		Excessive itching	Record of total number of animals showing repeated or prolonged rubbing or scratching
	Good human-animal relationship	Familiar human approach test	Record of the closest distance of approach of the stockworker before a flight response by sheep
	Positive emotional state	Qualitative Behaviour Assessment (QBA)	Observation of ewes behaviour, scored through visual analogue scales

Thirteen farms maintained ewes in semi-intensive system, according to the definition given by EFSA (EUROPEAN FOOD SAFETY AUTHORITY, 2014), since sheep had outdoor access and were housed during night. From these, six M farms and two S farms presented pen with wooden slatted floor, in two M farms and two S farms ewes were housed in pen with straw and in one M farm ewes were housed in dirt floor. The farm that had M and S sheep maintained S ewes in semi-intensive

system and M ewes in intensive system, since sheep were kept in permanent housing with no access to pasture (EUROPEAN FOOD SAFETY AUTHORITY, 2014) and both ewe groups stayed in dirt floor. On two S farms sheep were maintained in semi-extensive system, being kept in fenced pastures and not housed, except when animals were sick or injured and during lambing.

The median number of ewes per farm was 150 (40-800) in S and 51 (20-1000) in M farms (TABLE 5). For the first level of the protocol 716 ewes on S farms and 830 ewes on M farms were observed. For the second level, on one S farm sheep were kept in semi-extensive system and it was not possible to bring the ewes to the pen for the individual evaluation; therefore, total number of evaluated S farms for the second level was six. Number of ewes evaluated for the second level was 164 in S and 267 in M farms. The breeds of the ewes were Texel (in 6 stud farms and in 7 meat farms); Suffolk (1 S and 4 M); Ile de France (1 S and 3 M); Dorper (3 S); Santa Inês (1 S and 2 M) and White Dorper (2 S). There was more than one breed on five stud farms and on three meat farms (TABLE 5).

Observations for the first level assessment were performed on outdoor conditions, except on two M farms in which ewes were kept indoor. For the second level, ewe assessment was performed in pen or in race in all evaluated farms.

4.2.1 Statistical analysis of results

Data of each level of assessment are presented as percentages, except the stocking density, which is presented as m²/ewe, flight distance, in meters, and the Qualitative Behaviour Assessment, as scores. Results were compared using the one-tailed Mann-Whitney U test, with the significance level of 0.05 and for yes/no questions, data was analysed using Chi-Square Test for Association.

4.3 RESULTS

4.3.1 Good feeding principle

Considering the body condition score (BCS), there was no difference between S and M ewes, with most evaluated animals having good BCS (TABLE 7). However, 1.7% S and 8.7% M evaluated ewes were emaciated. Two farms, one S

and one M, did not keep records of born and dead lambs; therefore, lamb mortality was calculated only on 6 S and 9 M farms. No differences were observed in lamb mortality between S and M farms (P>0.05). Water drinker was automatic in 5 S and 5 M farms, buckets in 2 S and 2 M farms and from natural water source in 2 M farms. The automatic drinker was not functioning in one M farm.

TABLE 7 - SCORES AND PERCENTAGES OF STUD (S) AND MEAT (M) SHEEP FARMS ASSESSED USING THE AWIN PROTOCOL IN THE EAST OF PARANA STATE, BRAZIL, BETWEEN SEPTEMBER AND DECEMBER 2015, CONSIDERING GOOD FEEDING PRINCIPLE

Indicators		Level assessment	First level assessment Median observed (minimum-maximum)		Other studies
			S	M	
Body condition score (%)	Emaciated	Second	1.7 (0.0-10.3)	8.7 (0.0-21.9)	-
	Thin	Second	31.8 (16.7-58.6)	31.9 (4.3-58.6)	40.6[1]
	Good	Second	49.5 (34.5-65.4)	49.3 (31.0-78.3)	54.7[1]
	Fat	Second	5.4 (0.0-25.0)	4.4 (0.0-26.3)	-
Lamb mortality (%)		First	10 (5.5-42.9)	9.5 (0-22.7)	15-20[2]
Water availability (%)	Water source functioning and accessible	First	100	90	-
Drinker cleanliness (%)	Dirty	First	0.0	11.1	-
	Partly dirty	First	57.1	55.6	-
	Clean	First	42.9	33.3	-

[1] Mean score of farms from Norway assessed in 2007 and 2008 (STUBSJØEN et al., 2011).

[2] Mean score worldwide farms (TURNER; CONINGTON; DWYER, 2015)

4.3.2 Good housing principle

Considering fleece cleanliness, related to comfort around resting, S farms had more ewes with the fleece clean and dry when compared to M farms (P<0.05). For the four following fleece cleanliness scores there were no differences (TABLE 8). Additionally, there were no differences in mild heat stress and panting characteristics (P>0.05 and P=0.053, respectively), although it was observed a tendency, with more

ewes presenting panting in S farms. In all M and 57.1% of the S farms ewes had access to shade or shelter.

For the criteria ease of movement, there were no differences when comparing S and M farms for the stocking density indicator (P>0.05). Pen dimension was considered good in 3 S and 4 M farms, adequate in 4 M farms and poor in 2 S farms and 2 M farms. There were no differences between S and M farms in relation to minor, respectively 33.5% and 30.9%, and major, respectively 3.6% and 9.0%, hoof overgrowth (P>0.05).

TABLE 8 - SCORES AND PERCENTAGES OF STUD (S) AND MEAT (M) SHEEP FARMS ASSESSED USING THE AWIN PROTOCOL IN THE EAST OF PARANA STATE, BRAZIL, BETWEEN SEPTEMBER AND DECEMBER 2015, CONSIDERING GOOD HOUSING PRINCIPLE

Indicators		Level assessment	First level assessment Median observed (minimum-maximum)		Other studies
			S	M	
Fleece cleanliness (%)	Clean and dry	Second	74.2 (9.4-96.6) a	4.7 (0.0-73.9) b	50.4[1]
	Dry or damp, light soiling	Second	25.8 (3.4-90.6)	68.4 (25.0-100.0)	-
	Wet, soiled with mud or faeces	First	0.0 (0.0-0.0)	0.0 (0.0-52.9)	-
		Second	0.0 (0.0-0.0)	0.0 (0.0-63.2)	-
	Very wet, heavily soiled	First	0.0 (0.0-0.0)	0.0 (0.0-10.3)	-
		Second	0.0 (0.0-0.0)	0.0 (0.0-12.5)	-
	Filthy	First	0.0 (0.0-0.0)	0.0 (0.0-0.0)	-
		Second	0.0 (0.0-0.0)	0.0 (0.0-0.0)	-
Mild heat stress (%)		First	4.3 (0.0-9.7)	0.0 (0.0-100.0)	-
Panting (%)		First	1.4 (0.0-100.0)	0.0 (0.0-15.2)	-
Access to shade/shelter (%)		First	57.1	100	-
Stocking density (m²/ewe)		First	3.9 (0.7-6.6)	1.6 (0.8-9.6)	1.2[2], 1.0[3]
Hoof overgrowth (%)	Minor	Second	33.5 (11.5-62.5)	30.9 (20.7-57.9)	1.0[2], 0.4[3], 25.4[4], 24.6[5]
	Major	Second	3.6 (0.0-6.9)	9.0 (0.0-26.3)	

NOTE: Different letters indicate statistical differences in median scores for Mann-Whitney test (P < 0.05).

[1] Mean score of farms from Norway assessed in 2007 and 2008 (STUBSJØEN et al., 2011).

[2] Mean score of organic farms from Basilicata, Italy, assessed in 2007 (NAPOLITANO et al., 2009)

[3] Mean score of conventional farms from Basilicata, Italy, assessed in 2007 (NAPOLITANO et al., 2009)

[4] Mean score of farms from North East region of Nigeria assessed in 1997 and 1998 (BOKKO; CHAUDHARI, 2001)

[5] Mean score of farms from Nigeria assessed in 1998 and 1999 (BOKKO; ADAMU; MOHAMMED, 2003)

4.3.3 Good health principle

Considering absence of injuries criteria, M ewes presented minor lesions to head or neck more often than S ewes (P<0.05) (TABLE 9), with 88% of this type of lesion occurring in the ears. However, there were no differences in major lesions to head or neck (P>0.05). For lesions to the body, S ewes presented minor lesions more often than M ewes (P<0.05). Major lesions to body, myiasis, minor and major lesions to legs did not differ between farms. Minor lesions to legs were observed in almost half of the evaluated ewes, 43.6% S and 49.8% M; however, major lesions median percentage was low in all farms, 0.0%.

There was no difference in lameness scores between S and M ewes. Most ewes, 92.7% in S and 93.9% in M farms, were not lame. Considering faecal soiling indicator, light soiling and dags for the second level assessment was 0.0% S and 36.8% M; soiling and dags, for the first and the second level assessment was 0.0% and 0.0% S; 11.4% and 17.4% M, respectively, being more common higher faecal soiling scores in M ewes. None faecal soiling (69.9% S and 14.1% M); very light (28.3% S and 21.5% M); and extensive soiling and dags (0.0% for both groups and both level assessment), did not differ (P>0.05).

There were no differences in scores of the ocular mucosa colour between S and M ewes, and 43.2% M and 41.5% S ewes were characterized as not anaemic. Ocular discharge (4.0% S and 4.8% M), mastitis and udder lesions (0.0% for both groups) and respiratory problems (8.9% S and 10.4% M) had no differences between groups. Fleece loss was different, with more S ewes (95.8%) presenting no loss and less S ewes having some loss (4.2%) comparing to M ewes (82.7% and 17.3% respectively). Significant loss was equal for both groups (0.0%).

The welfare criteria absence of pain induced by management procedures was different only on the first level assessment, with more M ewes presenting docked tail (4.1%) than S ewes (0.0%). Undocked (0.0% for both groups and level assessment); short docked tail for the first (98.3% S and 96.0% M) and second

assessment levels (94.2% S and 96.0% M) and docked tail for second level assessment (0.0% S and 4.0% M) were equal for both groups.

TABLE 9 - SCORES AND PERCENTAGES OF STUD (S) AND MEAT (M) SHEEP FARMS ASSESSED USING THE AWIN PROTOCOL IN THE EAST OF PARANA STATE, BRAZIL, BETWEEN SEPTEMBER AND DECEMBER 2015, CONSIDERING GOOD HEALTH PRINCIPLE

(to be continued)

Indicators		Level assessment	First level assessment Median observed (minimum-maximum)		Other studies
			S	M	
Lesions to head/neck (%)	Minor	Second	3.4 (0.0-8.3) b	10.4 (0.0-26.3) a	8.0[1], 16.7[2]
	Major	Second	0.0 (0.0-0.0)	0.0 (0.0-10.5)	-
Lesions to body (%)	Minor	Second	8.4 (3.1-27.6) a	0.0 (0.0-13.0) b	3.9[1], 1.35[3], 1.79[4]
	Major	Second	0.0 (0.0-0.0)	0.0 (0.0-17.4)	-
Myiasis (%)		Second	0.0 (0.0-17.2)	0.0 (0.0-4.3)	-
Lesions to legs (%)	Minor	Second	43.6 (33.3-62.1)	49.8 (28.1-89.5)	54.0[1]
	Major	Second	0.0 (0.0-0.0)	0.0 (0.0-3.4)	-
Lameness (%)	Not lame	Second	92.7 (89.7-96.6)	93.9 (84.2-100.0)	-
	Minor lameness	First	2.8 (0.9-9.2)	6.3 (0.0-21.2)	1.4[1], 6.6[3], 3.5[4], 17.8[5], 18.1[6], 13.39[7]
		Second	4.0 (3.1-10.3)	4.0 (0.0-15.8)	
	Lame	First	0.0 (0.0-2.5)	0.0 (0.0-5.0)	
		Second	0.0 (0.0-4.2)	0.0 (0.0-5.3)	
	Severely lame	First	0.0 (0.0-0.0)	0.0 (0.0-0.0)	
		Second	0.0 (0.0-0.0)	0.0 (0.0-0.0)	
Faecal soiling (%)	None	Second	69.9 (54.2-100.0)	14.1 (0.0-100.0)	-
	Very light soiling	Second	28.3 (0.0-45.8)	21.5 (0.0-48.3)	
	Light soiling and dags	Second	0.0 (0.0-4.2) b	36.8 (0.0-57.9) a	
	Soiling and dags	First	0.0 (0.0-7.5) b	11.4 (0.0-28.8) a	28.3[3], 35.3[4], 13.41[7]
		Second	0.0 (0.0-0.0) b	17.4 (0.0-44.8) a	
	Extensive soiling and dags	First	0.0 (0.0-1.7)	0.0 (0.0-11.8)	
		Second	0.0 (0.0-0.0)	0.0 (0.0-15.6)	

(conclusion)

Indicators		Level assessment	First level assessment Median observed (minimum-maximum)		Other studies
			S	M	
Mucosa colour (%)	Not anaemic (0)	Second	39.5 (10.3-58.3)	21.5 (10.5-52.6)	-
	Not anaemic (1)	Second	43.9 (29.2-71.9)	57.6 (31.6-68.4)	-
	Borderline anaemic (2)	Second	14.6 (3.1-24.1)	14.7 (4.3-26.3)	-
	Anaemic (3)	Second	1.6 (0.0-6.9)	5.8 (0.0-10.5)	-
	Severely anaemic (4)	Second	0.0 (0.0-0.0)	0.0 (0.0-15.8)	-
Ocular discharge (%)		Second	4.0 (0.0-16.7)	4.8 (0.0-10.5)	1.1[1]
Mastitis and udder lesions (%)		Second	0.0 (0.0-12.5)	0.0 (0.0-5.3)	1.1[1]
Respiratory problems (%)		Second	8.9 (3.4-15.4)	10.4 (0.0-25.0)	0.6[1], 0.87[7]
Fleece loss (%)	None	Second	95.8 (54.2-100.0) a	82.7 (15.8-96.9) b	-
	Some loss	Second	4.2 (0.0-45.8) b	17.3 (3.1-78.9) a	0.74[7]
	Significant loss	First	0.0 (0.0-0.8)	0.0 (0.0-7.4)	-
		Second	0.0 (0.0-0.0)	0.0 (0.0-12.5)	

NOTE: Different letters indicate statistical differences in median scores for Mann-Whitney test ($P < 0.05$).

[1] Mean score of farms from Norway assessed in 2007 and 2008 (STUBSJØEN et al., 2011).

[2] Percentage of sheep ears with lesions in the south east of England (EDWARDS; JOHNSTON, 1999)

[3] Mean score of organic farms from Basilicata, Italy, assessed in 2007 (NAPOLITANO et al., 2009)

[4] Mean score of conventional farms from Basilicata, Italy, assessed in 2007 (NAPOLITANO et al., 2009)

[5] Mean score of farms from North East region of Nigeria assessed in 1997 and 1998 (BOKKO; CHAUDHARI, 2001)

[6] Mean score of farms from Nigeria assessed in 1998 and 1999 (BOKKO; ADAMU; MOHAMMED, 2003)

[7] Mean score of farms from North-West England and North Wales assessed in 2009 and 2010 (PHYTHIAN et al., 2015)

4.3.4 Appropriate behaviour principle

There were no differences between S and M ewes for the appropriate behaviour principle (TABLE 10). During observations of ewes behaviour, animals have not shown social withdrawal behaviour or stereotypy. Excessive itching was

observed in one S ewe. Flight distance median was 2.5 and 2.4 meters for S and M ewes, respectively. Results for QBA were equal for both groups, predominating high positive and low negative emotional states (FIGURE 6).

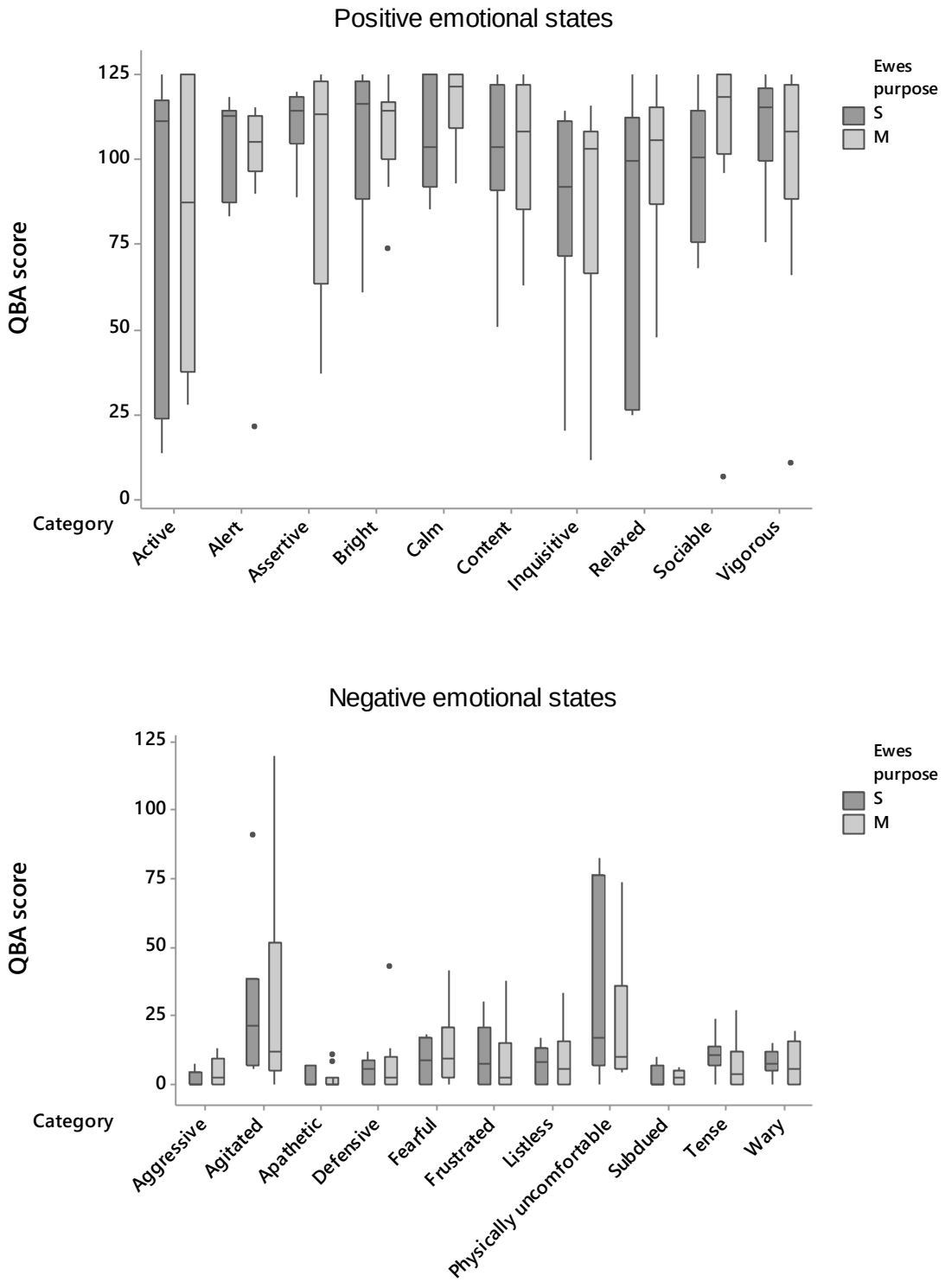
TABLE 10 - SCORES AND PERCENTAGES OF STUD (S) AND MEAT (M) SHEEP FARMS ASSESSED USING THE AWIN PROTOCOL IN THE EAST OF PARANA STATE, BRAZIL, BETWEEN SEPTEMBER AND DECEMBER 2015, CONSIDERING APPROPRIATE BEHAVIOUR PRINCIPLE

Indicators		Level assessment	First level assessment Median observed (minimum-maximum)		Other studies
			S	M	
Social isolation (%)		First	0.0 (0.0-0.0)	0.0 (0.0-0.0)	-
Stereotypy (%)		First	0.0 (0.0-0.0)	0.0 (0.0-0.0)	-
Excessive itching (%)		First	0.0 (0.0-0.8)	0.0 (0.0-0.0)	-
Familiar human approach test	Flight distance (m)	First	2.5 (0.9-5.4)	2.4 (0.5-6.7)	2.9[1], 4.7[2]
QBA (score)	Positive emotional state	First	110.6 (14-125)	110.0 (7-125)	-
	Negative emotional state	First	6.4 (0-91)	4.3 (0-120)	-

[1] Mean flight distance of gentled handled sheep (HARGREAVES; HUTSON, 1990)

[2] Mean flight distance of non-gentled handled sheep (HARGREAVES; HUTSON, 1990)

FIGURE 6 - QUALITATIVE BEHAVIOUR ASSESSMENT (QBA) SCORES OBSERVED IN EWES FOR STUD (S) AND MEAT (M) PURPOSES ASSESSED USING THE AWIN PROTOCOL IN THE EAST OF PARANA STATE, BRAZIL, BETWEEN SEPTEMBER AND DECEMBER 2015, SEPARATED IN POSITIVE AND NEGATIVE EMOTIONAL STATES; OUTLIERS ARE REPRESENTED AS ⋆.



SOURCE: The author (2016).

4.4 DISCUSSION

4.4.1 Good feeding principle

For the present work 49.3% of ewes presented good BCS (TABLE 7), however a higher percentage of ewes, 54.7%, from 36 farms in Norway, which included Norwegian White, Spælsau and Texel breeds, presented good BCS (STUBSJØEN et al., 2011). Body condition scores depend on adequate feeding management, in terms of avoidance of excessive or limited energy content of the diet and of unbalance between nutrient intake and requirements of the animal on a given physiological stage (CAROPRESE et al., 2009). Although BCS does not indicate current hunger, it does provide information on long-term nutritional status (LLONCH et al., 2015). BCS in ewes also directly impacts lamb survival and weaning weight, probably because of the increased production of milk in ewes with better body condition (BOMFIM; ALBUQUERQUE; SOUSA, 2014). Lamb mortality can serve as an integrated welfare measure as other welfare challenges within a sheep farming system, such as nutrition of ewe during pregnancy, stress and lambing management, impact on lamb survival and consist important aspects of animal welfare (DWYER, 2008). In the present work, pre-weaning lamb mortality (TABLE 7) was smaller than worldwide averages 15% to 20% (TURNER; CONINGTON; DWYER, 2015). Once extensive management systems for sheep production are the most common in all sheep producing countries (KILGOUR et al., 2008), probably the smaller lamb mortality observed in the present study is due to the frequent semi-intensive management used in Parana, in which ewes and their lambs are housed during night, avoiding predators, such as feral dogs; this proximity allows farmers to readily perceive and take corrective actions regarding specific problems such as lamb weakness, for example.

On the M farm in which automatic drinker was not functioning, water source was inadequate because water through was empty and dirty during the assessment. Remaining farms seemed to maintain adequate water supply. Absence of prolonged thirst is evaluated by the number and cleanliness of water sources, because there are currently no acceptable animal-based measures (EUROPEAN FOOD SAFETY AUTHORITY, 2014). Although such resource-based indicators may often be assessed reliably and quickly, there is no evidence that they reflect the degree of

thirst accurately or precisely, and a research with broiler chickens indicated that voluntary water consumption from open drinker shows promise for an on-farm test of thirst (VANDERHASSELT et al., 2014). Similar studies with ewes are important to determine animal-based measures considering this welfare criteria.

4.4.2 Good housing principle

Differences in fleece cleanliness were probably due to the fact that S ewes are sheared more frequently than M ewes. S ewes are taken into sheep exhibitions, being important for ewe presentation the removal of the wool. However, considering the animal welfare protocol (AWIN, 2015), in which fleece cleanliness clean and dry and dry or damp with light soiling are appropriate, it may be considered that both S and M ewes had good comfort around resting.

Considering thermal comfort criteria, although thermal stress can arise from extremely low temperatures, provoking hypothermia, or extreme high temperatures, causing hyperthermia, with sheep having behavioural and physiological coping strategies for these conditions (LLONCH et al., 2015); in practice, only heat stress is considered an important welfare issue in adult sheep (AWIN, 2015). The trend for a difference observed in panting indicator between S and M ewes is probably due to the absence of shade or shelter in some S farms, once it is known that respiratory rate is greater in non-sheltered sheep in relation to sheep with access to shade, apparently caused by direct solar radiation (SILANIKOVE, 1987). It is important to conduct further research for this indicator, to verify whether this trend is confirmed. MARAI et al. (2007) mentioned that heat stress can alter the biological functions of sheep with nutritional deficiencies observed in reduced efficiency of food intake and changes in water metabolism, protein, energy and damage to reproductive functions, which both reduces the welfare status of the animals and generates economic losses to the producer.

Considering stocking density, most ewes had good or adequate space according to AWIN (2015) information. In Basilicata, Italy, indoor space for sheep had, respectively, 1.2 m²/ewe and 1.0 m²/ewe in organic farms and conventional farms, suggesting that the most critical aspects were the low indoor space allowance and the lack of an outdoor paddock in 67% and 55% in conventional and organic farms, respectively (NAPOLITANO et al., 2009). Although ewes evaluated in the

present study had a higher space than in Basilicata, in four farms sheep had poor space according to AWIN protocol. Therefore, it is important to establish better conditions to some sheep farms in relation to stocking density indicator. Due to the variability observed in the present study, conduction of researches for evaluation of more farms in Parana is necessary.

Causes for hoof overgrowth in sheep are associated with environmental, nutritional and anatomical factors (REILLY; BAIRD; PUGH, 2002). Hoof overgrowth was observed in 1% of sheep from organic farms and in 0.4% of sheep from conventional farms in Basilicata, Italy (NAPOLITANO et al., 2009). In studies realized in Nigeria, 25.4% and 24.6% of sheep presented hoof overgrowth (BOKKO; CHAUDHARI, 2001; BOKKO; ADAMU; MOHAMMED, 2003), being closer to our results (TABLE 8). The difference observed between the studies is probably due to the management of sheep, once in the work done in Italy both conventional and organic farms based their farming systems on an extensive use of the land by grazing animals (NAPOLITANO et al., 2009), while in the Nigeria study some sheep were kept in semi-intensive management (BOKKO; ADAMU; MOHAMMED, 2003), as in our study. According Reilly; Baird and Pugh (2002) some herds may require foot trimming every six weeks to two months to minimize the incidence of foot disorders. There is no date about trimming frequency from assessed ewes, however more frequently trimming is necessary in ewes from Parana considering the high incidence of hoof overgrowth.

4.4.3 Good health principle

High percentage of head or neck lesions in M ewes is due to the high ears lesions observed, mainly tears caused by tag identification. Considering S farms, ewes were identified by collar on one farm and by ear tattoo on two farms, and did not have plastic tags attached to their ears in these three farms, which represents 50% of S farms (3/6); on the other hand, in only 20% (2/10) M farms ewes did not have tags for identification. In England, 16.7% of sheep had ears lesions on-farm caused by ear tags (EDWARDS; JOHNSTON, 1999). Multiple tags, holes, tears or other damage to ears suggest tags may not be properly applied and placed, or that the type of tag used may not be correct (EUROPEAN FOOD SAFETY AUTHORITY, 2014). Any method of identification must not only be effective but also safeguard the

welfare of the animal. Therefore, care is required during the insertion of any type of ear tag to avoid poor placement and unnecessary trauma and to ensure that animals are properly tagged the operators need to be instructed and effectively trained (EDWARDS; JOHNSTON, 1999). Our results suggest that ear tag identification is not the best strategy in terms of sheep welfare; other identification strategies must be considered and studied in terms of animal welfare.

Considering that other management procedures in S and M farms were similar, body lesions observed more often in S ewes may be related to the fact that these ewes where sheared more frequently. This in turn may be related to three possibilities: (1) it was easier to observe minor lesions on their body when compared to sheep that were not sheared, because wool may hide minor lesions, (2) shearing itself maybe have a causal relationship with minor lesions, and (3) the presence of wool may act as a protective barrier, decreasing chances for minor lesions to the skin to occur. Some of these possibilities were discussed by Napolitano (2009), who states that visiting farms in early summer, soon after shearing, it is possible to make easier detection of lesions in sheep; and by Roger (2008), who states that shearing is a common cause of injuries through either speed or inattention at a critical moments.

The main leg injury observed in the present study was knee callus, that is formed on areas of the skin that receive chronic mild to moderate abrasion from objects in the environment (ANDERSON; RINGS; PUGH, 2002). Most sheep assessed were kept indoors during the night, in sheds with slatted wooden floor or straw. Although callus can indicate prolonged lying on hard surfaces (AWIN, 2015), Anderson, Rings and Pugh (2002) state that these lesions are normal unless they have associated exudate or swelling, which was not observed in the majority of ewes in our study; or pain that can be assessed by lameness.

Median prevalence of lameness observed in our study was higher than that in conventional farms in Basilicata (3.5%); however it was smaller than lameness occurrence in organic farms, also in Basilicata, (6.6%) (NAPOLITANO et al., 2009), in sheep examined in Nigeria flocks (17.8%; 18.1%) (BOKKO; CHAUDHARI, 2001; BOKKO; ADAMU; MOHAMMED, 2003) and in sheep in UK and Ireland, where the prevalence of lameness was between 8% and 10% (TURNER; CONINGTON; DWYER, 2015). According to experts in sheep farming and welfare research from farms across England and Wales, lameness was identified as the main sheep welfare issue, being cited by 84% of the respondents (PHYTHIAN et al., 2011). The vast

majority of lameness cases can be attributed to interdigital dermatitis and foot rot, with environmental factors as wet and muddy grounds, average temperatures above 10 °C, sharp stones on pasture, high stocking density and dirty floors being important predisposing factors (EUROPEAN FOOD SAFETY AUTHORITY, 2014). Indeed, North-West England and North Wales flocks presented higher levels of lameness during autumn, coinciding with the mating period, and in winter, when most sheep flocks were housed, with high lameness prevalence related to high levels of infectious foot rot (PHYTHIAN et al., 2015). In Parana, indoor floor characteristics, semi-intensive management with access to pasture during all year, including winter, and good or adequate stocking density may be related to lower rates of lameness.

Ewes presented lower breech soiling than that observed in other studies (TABLE 9); however, M ewes presented higher faecal soiling than S ewes. Differences observed may be due to the same reason S ewes had high fleece cleanliness: more frequent shearing. Furthermore, S farms had predominantly hair-blood breed more often than M farms, with less quantity of faecal material adhering to the breech area in Dorper, White Dorper and Santa Ines breeds. However, although tail length, wool type or length and the physical anatomy of the sheep rear can influence dag formation, faecal consistency is the principal factor influencing dag production (WAGHORN et al., 1999). According to Phythian et al. (2015), an increased level of breech soiling at spring may be due changes in nutrition and the greater parasite challenges of the spring grazing season. Information regarding nutrition management and use of anthelminthics were not recorded in this study, and nutrition and endoparasites may also be related to the difference observed in faecal soiling occurrence, being possible that S ewes received different nutrition and greater health care. These hypotheses are important issues for future studies.

Mastitis was observed in low number of ewes. According to StubsjØen et al. (2011) inflammation of the udder in ewes were also low (1.1%) in Norway. Worldwide, clinical mastitis in small ruminants has an incidence usually lower than 5% (BERGONIER et al., 2003) and the situation is similar in Brazil (PEIXOTO; MOTA; COSTA, 2010). Moreover, mastitis incidence was smaller in wool sheep breeds when compared to hair breeds (PEREIRA et al., 2014). Therefore, as most farms in the present study kept wool sheep breeds, this may be related to the low percentage of mastitis observed. Additionally, mastitis is a common welfare problem

in ewes reared for milk production (EUROPEAN FOOD SAFETY AUTHORITY, 2014), which was not the case in this study.

Considering the respiratory quality, the main problem observed was watery nasal discharge, which is relatively common in sheep (DIFFAY et al., 2002). Nasal discharge generally occurs during times when sheep are housed in poorly ventilated buildings and is frequently seen in areas where the temperature fluctuates considerably during the day (DIFFAY et al., 2002). Nasal discharge was also observed in ewes in Norway, but with lower occurrence than observed in Parana (STUBSJØEN et al., 2011; TABLE 9). In Pernambuco, Brazil, nasal discharge was cited by 63.3% of sheep and goat farmers as common in their flock (ALENCAR et al., 2009). Nasal discharge observed in the present study may be more frequent than in other works because of the methodology applied, once for the present study it was considered watery, mucoid, serous and purulent discharge, being watery nasal discharge the more common. This problem may also be more frequent in Brazil due to the management of sheep in semi-intensive systems, in which ewes are housed at night in buildings that may be poorly ventilated, as observed in seven farms, from the present study, that had small or no windows. In a study by Phythian et al. (2015), only coughing was considered as respiratory problem, occurring in 0.87% of sheep. For the present study only one S ewe, from all assessed farms, showed coughing as respiratory problem, also presenting nasal discharge.

In North-West England and North Wales wool loss affected a mean proportion of 0.74% of the sheep (PHYTHIAN et al., 2015), therefore, fleece loss in Parana was higher (TABLE 9). Fleece loss indicator may be associated to ectoparasitism, stress or nutritional imbalance (AWIN, 2015). Differences were observed between S and M ewes, with more M ewes presenting fleece loss, which in addition to more faecal soiling can indicate that these ewes had some nutritional imbalance, despite the similarity in BCS.

A higher percentage of ewes from M farms presented longer docked tail, as compared to S farms. Short docked tails observed more often in S ewes may be related to breed standards for sheep from stud farms. However, overall in Parana most S and M ewes had short docked tail, leaving the vulva and anus exposed. There is both behavioural and physiological evidence that tail docking is painful for sheep (SUTHERLAND; TUCKER, 2011); and it is known that in most farms pain relief methods are not used. In Parana, only 5.1% of 146 farmers interviewed used

anaesthesia during the procedure of tail docking in sheep (STAMM; MOLENTO; MOLENTO, unpublished results). Therefore, most ewes evaluated in this work were not free from pain induced by management procedures.

4.4.4 Appropriate behaviour

According to Dawkins (2004), animal health and motivation are two significant characteristics to animal welfare, and both can be accessed through animal behaviour. Ewes presented normal behaviour and good human-animal relationship. The quality of interactions with stock-people is especially relevant to small ruminants, because they tend to be afraid of people and studies have demonstrated that human-animal relationship has an impact on sheep welfare (CAROPRESE et al., 2009). The good relationship between handler and lambs raised in intensive system reduced the risk of animals getting ill, due to greater stability of the immune system (CAROPRESE et al., 2006). In the present study, median flight distance for assessed ewes was lower than that observed in sheep gently handled (2.9 m) and non-gently handled sheep (4.7 m) in Australia (HARGREAVES; HUTSON, 1990). Thus, our results suggest good relationship between humans and ewes on assessed farms. This good relationship can be explained by management system on farms in Parana, mostly semi-intensive, in which sheep have contact to farmer or stockworker every day.

Qualitative behavioural assessment (QBA) is based on observer ability to capture the dynamic complexity of an animal's demeanour as it interacts with the environment (FLEMING et al., 2015). The assessment of appropriate behaviour occurred mostly on grassland, which is the natural environment for sheep (DWYER, 2009). This can explain the normal behaviour observed in sheep, with positive emotional states prevailing over negative ones (FIGURE 6).

4.5 CONCLUSION

This is the first study of welfare assessment in sheep through a welfare protocol in a country out of the European Union. Results suggest that main characteristics which reduce the degree of sheep welfare in the State of Parana are hoof overgrowth, lesions to body and head, ocular and nasal discharge and pain

induced by management procedures, in this case, tail docking. Constant assessment of sheep on farm is necessary to identify problems and improve ewe management, promoting animal welfare. We were able to identify main welfare restrictions in both stud and meat farms; overall welfare seems higher in stud farms considering fleece characteristics.

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5 FINAL CONSIDERATIONS

Results of our study indicate that, considering animal welfare, tail docking is a management that should be ceased in sheep production in Southern Brazil, mainly because of the lack of anesthesia use during the docking procedure and the low prevalence of fly strike even when animals are not docked. Reasons given to tail docking such as breed standards and esthetics are not justifiable and substantial changes regarding breed standards and culture are urgently needed in order to reduce unnecessary pain in sheep. However, considering hygiene, compensation strategies are probably necessary after the ceasing of tail docking procedure, once undocked ewes had higher dag scores than docked ewes. Therefore, future studies about hygiene monitoring and measurements of breech area hygiene in wool sheep with undocked tails are important.

In relation to critical points of welfare of sheep in the State of Parana, our results suggest that the main characteristics which reduce the degree of sheep welfare are hoof overgrowth, lesions to body and head, ocular and nasal discharge and pain induced by management procedures, in this case, tail docking. With growing public concern in relation to animal welfare and considering the lack of information about sheep welfare in Brazil, the use of protocols are necessary to assess critical point of welfare in sheep, also in other states from Brazil.

It is hoped that results of the present study encourage farmers and people directly involved to animals to question cultural practices that affect animal welfare, as tail docking in sheep, and to constantly assess sheep welfare, identifying problems and improving sheep management. Considering animals and the long-term image of the production chain, it is clear the importance of farm animal welfare. Therefore, more research about sheep welfare in Brazil is welcome.

APPENDIX 1 - QUESTIONNAIRE ABOUT FARMER PERCEPTIONS CONCERNING SHEEP TAIL DOCKING IN THE STATE OF PARANA, BRAZIL

1) County where sheep were raised.

2) Gender of the respondent.

3) Breed of sheep in your farm.

4) How many sheep are in your farm?

5) From these animals, how many are female?

6) Are your sheep tail docked?

7) If the answer for question 6 is yes, in which animal category?

8) Which method is used for tail docking?

9) Who is the person who performs tail docking?

10) Is it used pain control during tail docking?

11) After tail docking is it performed injury management?

12) Do you believe that sheep are sentient beings, in other words, that sheep have the capacity to suffer and experience fear and pain?

13) Do you believe that sheep feel pain because of the tail docking procedure?

14) Do you believe that sheep feel any discomfort because of the tail docking procedure?

15) For which reasons it is performed (or not) tail docking in your animals?

16) How frequent is the occurrence of myiasis and other ectoparasites caused by flies in your sheep?

17) What is the sheep body part where ectoparasites caused by flies are commonest?

ANNEX 1 – CERTIFICATE OF THE ANIMAL USE ETHICS COMMITTEE OF THE AGRICULTURAL SCIENCES CAMPUS OF THE UNIVERSIDADE FEDERAL DO PARANÁ, PROTOCOL NUMBER 057/2014

UNIVERSIDADE FEDERAL DO PARANÁ
SETOR DE CIÊNCIAS AGRÁRIAS
COMISSÃO DE ÉTICA NO USO DE ANIMAIS

CERTIFICADO

Certificamos que o protocolo número 057/2014, referente ao projeto "Estudo do manejo de ovelhas com cauda", sob a responsabilidade de Fabiana de Orte Stamm, na forma em que foi apresentado (utilização de 100 ovelhas e como grau B de invasividade), foi aprovado pela Comissão de Ética no Uso de Animais do Setor de Ciências Agrárias, em reunião realizada dia 10 de Outubro de 2014.

CERTIFICATE

We certify that the protocol number 057/2014, regarding the project "Study of the management of sheep with tail" under Fabiana de Orte Stamm's supervision, in the terms it was presented (use of 100 sheep and was classified as grade B of invasiveness), was approved by the Animal Use Ethics Committee of the Agricultural Sciences Campus of the Universidade Federal do Paraná (Federal University of Paraná, Brazil) during session on October 10th, 2014.

Curitiba, 10 de Outubro de 2014.

Ricardo Guilherme D'Otaviano de Castro Vilani
Presidente CEUA-SCA

Ananda Portella Félix
Vice-Presidente CEUA-SCA

Comissão de Ética no Uso de Animais do Setor de Ciências Agrárias - UFPR

ANNEX 2 – CERTIFICATE OF THE ANIMAL USE ETHICS COMMITTEE OF THE AGRICULTURAL SCIENCES CAMPUS OF THE UNIVERSIDADE FEDERAL DO PARANÁ, PROTOCOL NUMBER 060/2015

UNIVERSIDADE FEDERAL DO PARANÁ
SETOR DE CIÊNCIAS AGRÁRIAS
COMISSÃO DE ÉTICA NO USO DE ANIMAIS

CERTIFICADO

Certificamos que o protocolo número 060/2015, referente ao projeto **"Pontos críticos de bem estar de ovinos no estado do Paraná e estudo do manejo de ovelhas com cauda"**, sob a responsabilidade de **Fabiana de Orte Stamm** – que envolve a produção, manutenção e/ou utilização de animais pertencentes ao filo Chordata, subfilo Vertebrata (exceto o homem), para fins de pesquisa científica ou ensino – encontra-se de acordo com os preceitos da Lei nº 11.794, de 8 de Outubro, de 2008, do Decreto nº 6.899, de 15 de julho de 2009, e com as normas editadas pelo Conselho Nacional de Controle da Experimentação Animal (CONCEA), e foi aprovado pela COMISSÃO DE ÉTICA NO USO DE ANIMAIS (CEUA) DO SETOR DE CIÊNCIAS AGRÁRIAS DA UNIVERSIDADE FEDERAL DO PARANÁ - BRASIL, com grau B de invasividade, em reunião de 08/07/2015

Vigência do projeto	03 de Agosto de 2015 a 29 de Janeiro de 2016
Espécie/Linhagem	Ovinos de todas as raças
Número de animais	1840
Peso/Idade	Variado
Sexo	Fêmeas
Origem	Propriedades rurais do Paraná

CERTIFICATE

We certify that the protocol number 060/2015, regarding the project "**Critical welfare points of sheep in the state of Paraná and management study of sheep with tail",** under **Fabiana de Orte Stamm** supervision – which includes the production, maintenance and/or utilization of animals from Chordata phylum, Vertebrata subphylum (except Humans), for scientific or teaching purposes – is in accordance with the precepts of Law nº 11.794, of 8 October, 2008, of Decree nº 6.899, of 15 July, 2009, and with the edited rules from Conselho Nacional de Controle da Experimentação Animal (CONCEA), and it was approved by the ANIMAL USE ETHICS COMMITTEE OF THE AGRICULTURAL SCIENCES CAMPUS OF THE UNIVERSIDADE FEDERAL DO PARANÁ (Federal University of the State of Paraná, Brazil), with degree B of invasiveness, in session of 07/08/2015.

Duration of the project	August, 03, 2015 to January, 29, 2016
Specie/Line	Sheep of different breeds
Number of animals	1840
Wheight/Age	Varied
Sex	Females
Origin	Farms from Parana

Curitiba, 08 de Julho de 2015.

Ananda Portella Félix
Presidente CEUA-SCA

Simone Tostes de Oliveira Stedile
Vice-Presidente CEUA-SCA

Comissão de Ética no Uso de Animais do Setor de Ciências Agrárias - UFPR

ANNEX 3 – CERTIFICATE OF THE ETHICS COMMITTEE ON RESEARCH ON HUMANS OF THE UNIVERSIDADE FEDERAL DO PARANÁ, PROTOCOL NUMBER 34820114.0.0000.0102

UNIVERSIDADE FEDERAL DO PARANÁ - SETOR DE CIÊNCIAS DA SAÚDE/ SCS -

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: PERCEPÇÃO E ATITUDES HUMANAS SOBRE A SENCIÊNCIA ANIMAL E QUESTÕES RELACIONADAS AO BEM-ESTAR ANIMAL
Pesquisador: Carla Forte Maiolino Molento
Área Temática:
Versão: 3
CAAE: 34820114.0.0000.0102
Instituição Proponente: Programa de Pós-graduação em Ciências Veterinárias
Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 814.835
Data da Relatoria: 26/09/2014

Apresentação do Projeto:
PERCEPÇÃO E ATITUDES HUMANAS SOBRE A SENCIÊNCIA ANIMAL E
QUESTÕES RELACIONADAS AO BEM-ESTAR ANIMAL
Carla Forte Maiolino Molento
Trata-se de projeto de pesquisa amplo, linha de pesquisa da Prof. Dra. Carla Forte Maiolino, que visa avaliar a percepção e atitudes humanas sobre a senciência animal e questões relacionadas ao bem estar animal.

Objetivo da Pesquisa:
Geral: Estudar a percepção humana a respeito da capacidade de sentir (senciência) em diferentes espécies de animais e questões de bem-estar.
Específicos:
- Estudar a percepção de biólogos, médicos veterinários, zootecnistas, consumidores e produtores de ovinos no estado do Paraná em relação à presença de senciência e estados afetivos nos animais desta espécie,

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UNIVERSIDADE FEDERAL DO PARANÁ - SETOR DE CIÊNCIAS DA SAÚDE/ SCS -

Continuação do Parecer: 814.835

aplicando-se um questionário e comparando à população europeia;- Estudar a percepção de produtores em relação a diferentes práticas de rotina realizadas em animais de
produção;
- Avaliar atitudes dos produtores para a realização de diferentes práticas de manejo e/ou rotina realizadas em animais de produção;
- Conhecer as percepções da população em questões relacionadas ao bem-estar e abate de peixes no Brasil e na Colômbia;
- Avaliar as atitudes relacionadas ao sofrimento e maus tratos em diferentes espécies.
- Realizar pesquisa com produtores de ovinos associados à Associação Paranaense de Criadores de Ovinos (OVINOPAR) e/ou à Castrolanda para determinar a motivação para realização da caudectomia;

Avaliação dos Riscos e Benefícios:
De acordo com os pesquisadores a aplicação de questionários para avaliar a percepção dos respondentes pode ser considerada como de baixo risco. Os tipos de risco mais prováveis são a possibilidade de exposição de informações demográficas (idade, sexo, renda, grau de escolaridade), as quais serão confidenciais, anônimas, e constrangimento pela possibilidade de provocar experiências ou recordações de situações vividas que causaram algum tipo de sofrimento psíquico. Além disso, o respondente pode acreditar que está correndo risco de ser julgado, entretanto será disponibilizado espaço apropriado para que sejam realizados comentários referentes à pesquisa, com o objetivo de minimizar tal efeito.

Comentários e Considerações sobre a Pesquisa:
A maior força motriz para a melhoria do bem-estar animal é a opinião pública. Há grande demanda do público por melhorias no bem-estar animal dos animais. Essa demanda se reflete nas atividades de várias organizações sem ânimo de lucro e através dos meios de comunicação social e, finalmente, a nível político, através de uma melhor legislação. Consequentemente a melhoria de vida dos
animais pode acarretar em bem-estar humano a partir do consumo de produtos provenientes de

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animais com qualidade de vida adequada e condições de manutenção eticamente aceitáveis.

Considerações sobre os Termos de apresentação obrigatória:
Todos os termos obrigatórios foram anexados.

Recomendações:
Solicitamos que sejam apresentados a este CEP, relatórios semestrais e final, sobre o andamento da pesquisa, bem como informações relativas às modificações do protocolo, cancelamento, encerramento e destino dos conhecimentos obtidos, através da Plataforma Brasil - no modo: NOTIFICAÇÃO. Demais alterações e prorrogação de prazo devem ser enviadas no modo EMENDA. Lembrando que o cronograma de execução da pesquisa deve ser atualizado no sistema Plataforma Brasil antes de enviar solicitação de prorrogação de prazo.

Conclusões ou Pendências e Lista de Inadequações:
As pendências foram atendidas.
É obrigatório retirar na secretaria do CEP/SD uma cópia do Termo de Consentimento Livre e Esclarecido com carimbo onde constará data de aprovação por este CEP/SD, sendo este modelo reproduzido para aplicar junto ao participante da pesquisa.

O TCLE deverá conter duas vias, uma ficará com o pesquisador e uma cópia ficará com o participante da pesquisa (Carta Circular nº. 003/2011CONEP/CNS)

Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

Considerações Finais a critério do CEP:

UNIVERSIDADE FEDERAL DO PARANÁ - SETOR DE CIÊNCIAS DA SAÚDE/ SCS -

Continuação do Parecer: 814.835

CURITIBA, 01 de Outubro de 2014

Assinado por:
IDA CRISTINA GUBERT
(Coordenador)

Endereço: Rua Padre Camargo, 280
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VITA

In relation to tail docking practice in sheep, three abstracts were presented:

- STAMM, F. O.; TAMIOSO, P. R.; MOLENTO, C. F. M. Caudectomia em ovinos: Bases filosóficas e bem-estar animal. In: III CONGRESSO BRASILEIRO DE BIOÉTICA E BEM-ESTAR ANIMAL, 2014, Curitiba. ANAIS III CONGRESSO BRASILEIRO DE BIOÉTICA E BEM-ESTAR ANIMAL: Senciência e Bem-estar Animal Expandindo Horizontes, 2014. p. 289-291.
- STAMM, F.O.; MOLENTO, C.F.M. Methods used and reasons given for tail docking sheep in the state of Paraná, Brazil. In: Animal Populations – World Resources and Animal Welfare. UFAW International Animal Welfare Science Symposium. Zagreb, Croatia, 2015. p. 77.
- STAMM, F.O.; MENON, N.; PERES, M.T.P.; BERGSTEIN, T.G. MOLENTO, C.F.M. Escore de sujidade em ovelhas com cauda e sem cauda. In: XVII Simpósio Paranaense de Ovinocultura, V Simpósio Paranaense de Caprinocultura, V Simpósio Sul Brasileiro de Caprinos e Ovinos, Cascavel, Paraná, 2015.

The last abstract was awarded the Best Abstract Prize in the symposium: XVII Simpósio Paranaense de Ovinocultura, V Simpósio Paranaense de Caprinocultura, V Simpósio Sul Brasileiro de Caprinos e Ovinos, 2015.

From chapter 4, an abstract was sent for ISAE 2016, Edinburgh, United Kingdom and has been accepted by the Scientific Committee. Abstract no.: 23608.

- STAMM, F.O.; LEITE, L.O.; MOLENTO, C.F.M. Sheep welfare in stud and meat farms in South Brazil using the Animal Welfare Indicators protocol.