The importance of clinical mastitis in culling ewes on Texel sheep farms in The Netherlands

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Abstract

On meat sheep farms, profitability depends, among other things, on the performance of the ewes and their lambs. As culling ewes decrease the life-span of ewes and thus their profitability, culling is an important cost factor. An observational study was performed on clinical mastitis and culling in meat sheep flocks in The Netherlands. Aim of the study was to get an insight in the contribution of mastitis as a reason for culling ewes on meat sheep farms in The Netherlands, and to identify risk factors for mastitis related culling. We used a database of a Dutch organisation for goat- and sheep breeders, containing 12,735 sheep lambing records in 2014 to estimate the overall culling rate in Dutch meat ewes. Secondly, a questionnaire was send to 349 Texel sheep farmers to inquire about culling reasons and mastitis. On average, 35 percent of the ewes in this database were culled, but based on the questionnaire data, the average culling rate was only 21 percent. Udder health problems were the most common culling reason, reported by 66 percent of all farmers and the contribution of mastitis to culling ewes on meat sheep farms in The Netherlands was on average 41 percent. Univariable analyses using Chi-squared tests were performed to identify risk factors for mastitis related culling, showing a significantly higher mastitis related culling rate in farms with a farm size of 25 or more ewes. This study shows high culling rates in meat sheep and identifies udder health problems as the most important reason for culling, suggesting that udder health control may be important in lowering replacement rates and thus may increase the profitability of sheep farming.

Introduction

In 2014, The Netherlands housed 1.6 million dairy cows, 1 million sheep (mostly meat sheep) and at least 430,000 goats (CBS 2016). As with the dairy industry of goats and cows, also meat sheep farms face the consequences of mastitis.

Udder health of ewes who produce lambs for meat is of great importance. First, it is important because mastitis affects the welfare of ewes. Veterinarians and farmers who were asked to score the pain intensity of various diseases, ranked chronic mastitis 4 out of 10 (Fitzpatrick et al. 2006). Second, mastitis may affect the lambs, who need healthy milk to grow, although in a study by Keisler et al. (1992), subclinical mastitis did not influence lamb growth performance if the lambs were also fed with supplemental feed. However, another study showed a significant association between lamb growth and mastitis (Grant et al. 2016). This is probably the result of the fact that mastitis is associated with milk yield loss (Leitner et al. 2008). Third, mastitis can be a reason for culling ewes, leading to economic losses. The culling of lactating sheep in The Netherlands because of mastitis has been estimated 6 percent each year (Vellema 2008). Most of these ewes showed abnormalities in the udder.

In contrast to small ruminants, mastitis in cows is well investigated. Extrapolating the knowledge about cow mastitis to sheep mastitis is not always possible. The anatomy of the udder of ewes and cows has a few differences (Senger 2012) and the most commonly found bacteria in clinical mastitis are different between cows and ewes. The most important bacteria in cows with clinical mastitis are *Staphylococcus aureus, E. coli, Streptococcus uberis, Streptococcus agalactiae* and *Streptococcus dysgalactiae* (Barkema et al. 1998), whereas the most important bacteria in sheep with clinical mastitis are *Staphylococcus aureus* (Mork et al. 2007, Contreras et al. 2007) and *Mannheimia haemolytica* (Omaleki et al. 2011). Studies by

Mork et al. (2007) and Bergonier (2003) found lesser contribution of *Mannheimia haemolytica* as a pathogen for ewe mastitis.

The importance of mastitis as a reason for culling has, to our knowledge, not been investigated, although farmers report mastitis to be one of the most important reasons for culling. As culling is an important cost factor (Kosgey et al. 2003), it is important to investigate to what extent mastitis contributes to culling of meat sheep. Known risk factors for clinical mastitis in meat sheep are the age of the ewe, dystocia, the total number of lambs born, including stillborn lambs, and a history of clinical mastitis (Waage et al. 2008, Arsenault et al. 2008, Forde et al. 2002). Also heritability has been suggested as a risk factor for clinical mastitis (Conington et al. 2008, Menzies et al. 2001). Although these risk factors for clinical mastitis in sheep are known, it is unclear to what extent these risk factors are also associated to mastitis-related culling.

In this study, we used systematically collected sheep identification and registration data in combination with an online questionnaire to (1) investigate the culling rate in Dutch meat sheep, (2) estimate the contribution of mastitis as a reason for culling ewes on meat sheep farms, and (3) identify risk factors for mastitis related culling.

Materials and methods

Obtaining data

Lambing records database

A large database containing several years of lambing records of ewes owned by members of a Dutch sheep and goat breeders organisation (NSFO) was used to estimate the overall culling rate on Dutch meat sheep farms. The database contained the following information about ewes and their lambing: unique life number of the ewe, regimental number of the ewe, breed, place and date of birth ewe, unique life number ram, regimental number ram, date of birth lambs, number of lambs born alive, number of lambs born dead. The year of interest is 2014, because it is the most recent year with enough data available to calculate culling percentages. Only Texel breed sheep records with a lambing record in 2014 were used. Ewes with a recorded lambing in 2014 that had no record in 2015 were assumed to have been culled. Data with invalid values were excluded or revised if possible.

Questionnaire

A questionnaire was designed to gather information about mastitis related culling. The questionnaire was made in Dutch to prevent misunderstandings because of the language. To validate the questionnaire, farm visits were performed during the first 5 weeks of the research. The farmers to approach were selected by the NSFO staff. The farmers had an enrolment on a voluntary basis. The farm visits included a dialogue about the experiences of the farmers with mastitis, about the farm in the general. The farmers were asked to fill in the questionnaire and give feedback on the way the questions were asked, and to give suggestions for other questions. No corrections to the questionnaire were made based on the validation and the online questionnaire was sent by e-mail to 349 farmers housing Texel sheep. The questionnaire is presented in appendix 1, an English version is presented in appendix 2.

Statistical methods

The culling percentage was calculated by dividing the total culled animals by the total animals that lambed on the farm. The percentage mastitis related culling was calculated by dividing the cases culled because of mastitis by the number of ewes lambed on the farm. The

contribution of mastitis to culling was calculated by dividing the cases culled because of mastitis by the total culled animals.

The data from some questions of the questionnaire was categorized prior to analyses. The farm size was categorised in two classes (less than 25 and 25 or more animals lambing per year). Concentrate feeding was categorised in two categories (less than 500 grams per suckling lamb per ewe per day and 500 grams or more per suckling lamb per ewe per day). The duration of the concentrate feeding of the ewes was categorised into three groups (less than 5 weeks, 5-9 weeks and more than 9 weeks). The time spend in the stable after birth was categorised into three groups (went outside within 4 weeks, went outside in the 4th week and went outside after 4 weeks). The control moments were categorised into three groups (1 or 2 control moments, 3 control moments and more than 3 control moments). The mastitis related culling percentage was made into two groups for analyses. One group consisted of farms with more than 0% culling for mastitis from the total ewes lambed on the farm. The second group consisted of farms with more than 15% culling for mastitis from the total ewes lambed on the farm.

To find associations between different variables and mastitis related culling, Chi-squared test for comparing proportions was used. The statistical analyses were performed using IBM SPSS statistics 24. On the remaining results the statistics were performed, using IBM SPSS statistics 24 (IBM corp., Armonk, NY)

Results

Results lambing records database

In the database 246,735 lambings from the Texel breed were found. In 2014, 12,735 litters were recorded. From these, 450 litters were discarded because they did not contain information about the number of lambs born and therefore the existence of the litter was uncertain. Cases with two litters born within a few days but with a difference in the number of lambs born alive, were considered as cases registered to correct a first registration. Therefore the parity of the first record was considered the parity of culling. This resulted in a total number of valid lambings of 12,285 in the year 2014, of which 4,338 ewes were not present in the database in 2015, leading to an average culling percentage of 35% (see figure 1).

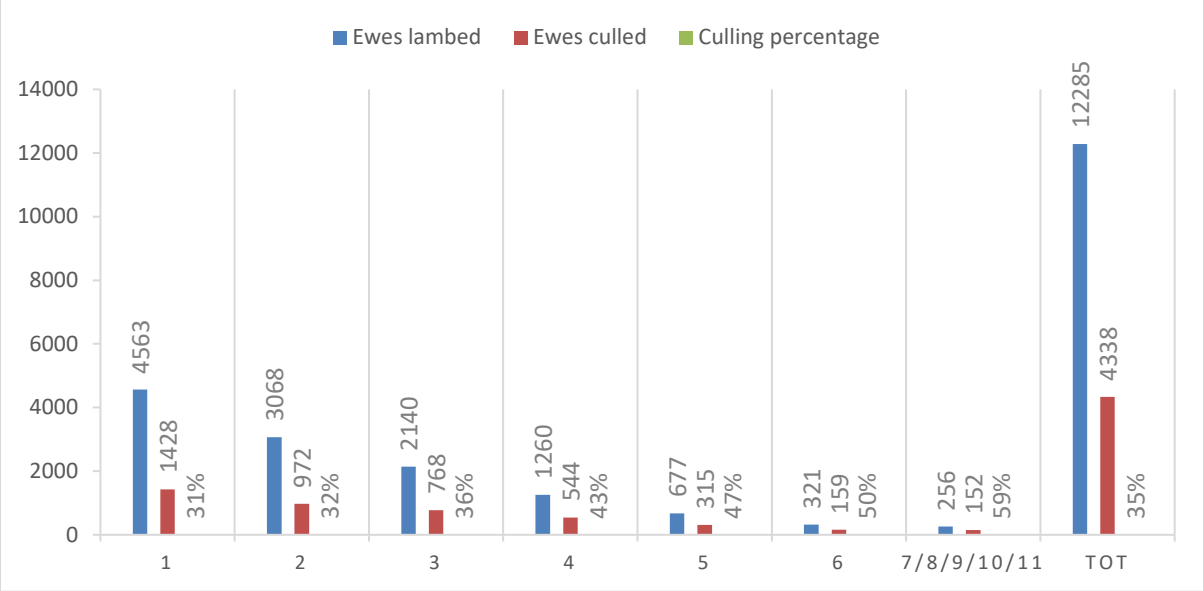

Figure 1. Percentages of ewes culled after lambing in 2014 across parity based on the lambing records database of the Dutch sheep

Questionnaire results

Initially, 71 farmers responded to the online questionnaire. After a reminder was sent (18 days after sending the initial invitation), 93 out of 349 farmers responded, which is a response rate of 27%. A total of 99 reactions are analysed, because information obtained from the 6 farms during the farm visits was filled in by the researcher. The farm size from the respondents ranged from 4 to 240 ewes lambing in the past 12 months. In these 12 months, a total of 3,941 litters were born. Of the 3,941 ewes lambed, 707 ewes were culled for various reasons, which gives an overall culling rate of 18%. The mastitis related culling comprised 295 cases and thus 7% of the total number of ewes was culled because of mastitis. This makes the contribution of mastitis to culling 295 of 707 animals (42%).

The percentage mastitis related culling does not follow a normal distribution (see figure 2b). On most farms, the mastitis related culling percentage is low. The most extreme value of 38% mastitis related culling from the total ewes lambed on the farm was found in a small farm with 8 ewes lambing in the past 12 months. The contribution mastitis to culling ewes on these farms was on average 41% but ranges from 0.00% to 100.00%. The histogram shows three peaks, at approximately 0%, 50% and 100% (see figure 2c). The farms with zero contribution of mastitis to culling had a culling rate ranging from 0% to 50%. This 50% was on a farm with 10 ewes.

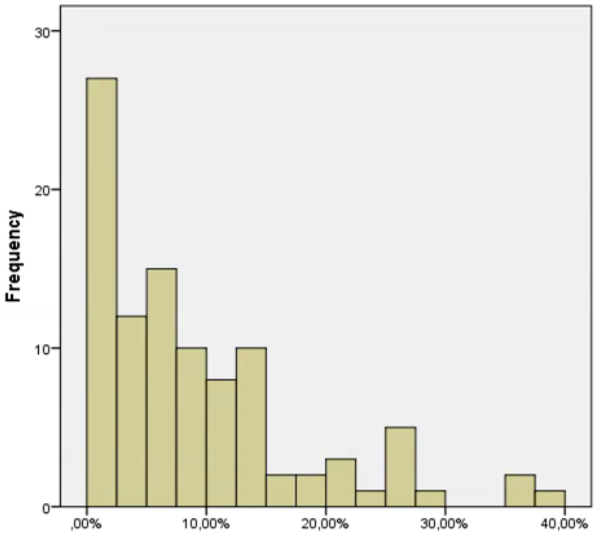

Figure 2a. Farmer-reported culling percentages as found in the questionnaire, based on 99 observations

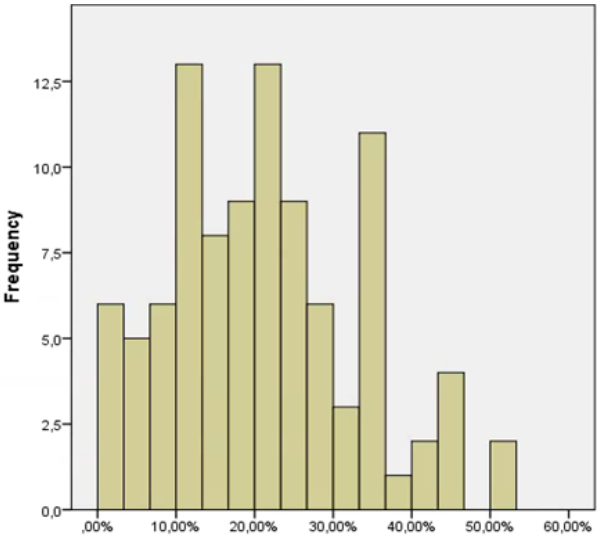

Figure 2b. Percentages mastitis related culling from total ewes lambed on the farm, based on 99 observations

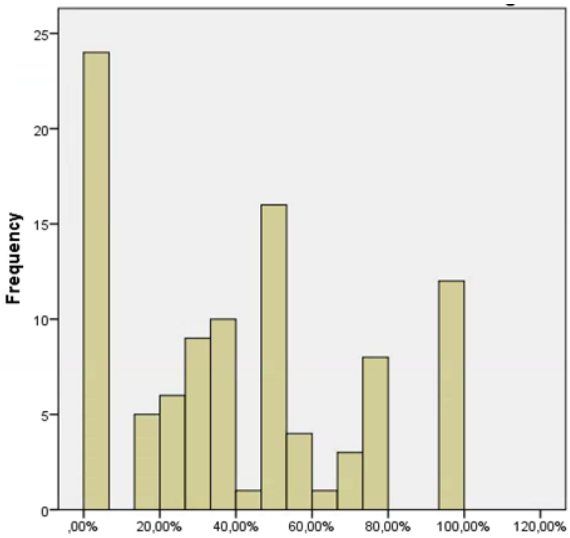

Figure 2c. Contribution mastitis to culling in percentage from total culling, based on 99 observations

Variable	Description	N	> 0% mastitis related culling N (%)	P (χ^2)	> 15% mastitis related culling N (%)	P (χ^2)
Farm size	0 (<25)	51	34 (67%)	0.02	13 (25%)	0.03
	1 (≥25)	47	41 (87%)		4 (9%)	
Farmer takes preventive measures	Yes	62	50 (81%)	0.12	13 (21%)	0.41
	No	29	19 (66%)		4 (14%)	
Palpating udder	Yes	72	54 (75%)	0.77	15 (21%)	0.12
	No	27	21 (78%)		2 (7%)	
Behaviour observations	Yes	71	54 (76%)	0.91	14 (20%)	0.29
	No	28	21 (75%)		3 (11%)	
Control moments	1 (<3)	35	27 (77%)	0.33	5 (14%)	0.25
	2 (3)	36	28 (78%)		4 (11%)	
	3 (>3)	28	20 (71%)		8 (29%)	
Concentrate feeding	0 (<500g)	39	29 (74%)	0.75	4 (10%)	0.16
	1 (≥500g)	57	44 (77%)		12 (21%)	
Duration concentrate feeding	1 (<5 wk)	15	11 (73%)	0.44	3 (20%)	0.93[1]
	2 (5 wk)	56	45 (80%)		9 (16%)	
	3 (>9 wk)	28	19 (68%)		5 (18%)	
Out in fields	1 (<4 wk)	36	26 (72%)	0.30	7 (19%)	0.87
	2 (4 wk)	23	17 (74%)		5 (22%)	
	3 (>4 wk)	31	27 (87%)		5 (16%)	

Table 1. Results univariable analyses with possible risk factors for mastitis related culling, based on answers derived from questionnaire
[1]Result of Fishers exact test

As seen in table 1, only the variable farm size was significantly associated with the percentage mastitis related culling from the total ewes lambed on the farm.

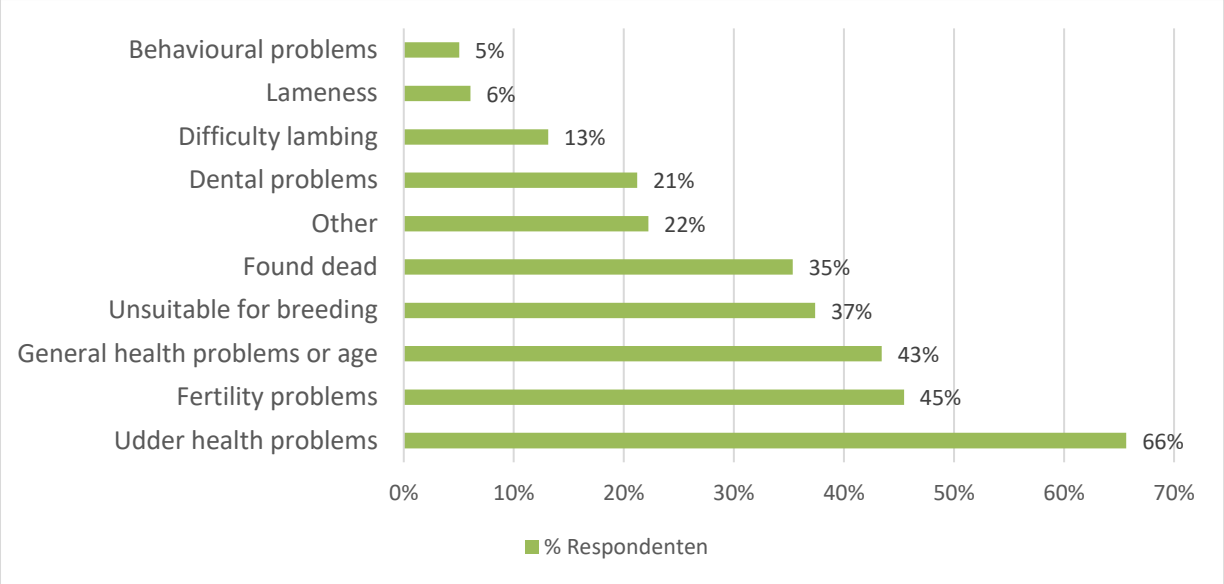

Figure 3. Overview culling reasons meat sheep based on answers derived from questionnaire with *n* respondents = 99

An overview of culling reasons as asked for in the questionnaire is presented in figure 3. Udder health problems was the most mentioned reason for culling in the questionnaire. Of the 99 respondents, 66% of farmers reported udder health as reason for culling in the past 12 months.

In the questionnaire and during farm visits, farmers could leave suggestions. Some farmers came up with suggestions for risk factors for mastitis related culling. The following possible risk factors were mentioned: presence of horseflies (n = 1), presence of orf (n = 1), weather influences (n = 2), shearing (n = 1), heritability (n = 1), number of suckling lambs (n = 2) and maedi visna (n = 1).

Out of 99 respondents, 62 farmers said to take preventive measures for mastitis, 29 farmers did not take preventive measures and for 8 farmers it was unknown. These 'unknown' results were marked as missing and were not included in the Chi-squared test. The farmers mentioned the following preventive measures: early weaning, late weaning, hygiene (general) and clean stable, enough feeding, rationed feeding after drying off, isolating affected sheep, maximum of two suckling lambs per ewe, daily udder control, use of internal teat seal, orf vaccination, providing extra minerals.

Discussion

Two data sources were used to estimate the culling rate in Dutch meat sheep and to study the contribution of mastitis to culling on meat sheep farms. The Texel breed was chosen, because it is the most important breed for meat production in The Netherlands and to avoid bias in the results because of different breeds.

Lambing records database

The total culling percentage of 35% over the year 2014 as found in the database differs from the on average culling percentage of 21% as found in the questionnaire. No recent studies on culling percentages on meat sheep farms in The Netherlands were found. A study by Visscher and Schreuder from 1981 to 1984 on 15 merely Texel breed sheep farms in The Netherlands found an average yearly replacement rate of 39% (Visscher et al. 1985). The average culling

percentage of 39% found by Visscher et al. (1985) is close to the culling percentage of 35% found in de lambing records database used in this study.

The percentage derived from the database might be overestimated because of the assumption about culling ewes in 2014. The assumption that an ewe not returning in the list of lambing after 2014 is culled in 2014, is not necessarily true in every case. Skipping lambing a year, being sold to another farmer or errors in the lambing records database can violate the assumption and unfairly mark ewes as culled. In the available data was searched for skipped years in lambing periods ending in 2014. Most ewes skipping a year of lambing were skipping a year after the first parity. Of ewes with parity 2 in 2014, 1% of ewes had skipped a year between parity 1 and 2. Of ewes with parity 3 in 2014, the highest skipping percentage was in between parity 1 and 2, where 0.5% of the ewes skipped a year. Of ewes with parity 4 in 2014, the highest skipping percentage was in between parity 1 and 2, where 0.5% of the ewes skipped a year. Less data from 2016 was available than from 2015, leading to the assumption not all data from 2016 was in the datasheet yet. Despite the small number of animals that might have been missed because of skipping lambing a year or missing data from 2016, the overview still gives an insight in the culling percentage and distribution of culling across parities in the year 2014. The culling percentage found with our questionnaire gives a much lower estimate, but this may have been biased as well as it is likely that farmers answered the questionnaire by heart without looking up the exact numbers we asked for. The questionnaire might not be totally representative for the meat sheep farms in The Netherlands, whereas the lambing records database more likely is. Respondents to the questionnaire probably are more interested in mastitis than non-responders. These respondents might have gathered more knowledge about preventing, diagnosing and treating mastitis, which may lead to a lesser contribute of mastitis to culling and a lower total culling rate.

Questionnaire

Udder health problems were in this study reported as the most important culling reason as it was mentioned by 66% of the questionnaire respondents. The study from Visscher et al. (1985) found an average mastitis related culling percentage from the total animals on the farm of 3%, which made the contribution of mastitis to culling 11%. The average of 11% differs from the 41% found in the questionnaire. The study from Visscher et al. (1985) contained only 15 farms, in contrast to the 99 farms in this study. The farms were breeding farms and the most important culling reason in this small study was ‘not suitable for breeding purposes’. The average mastitis related culling percentage from the total animals on the farm of 3% differs from the 7% found in this study. This might be due to the small study in comparison to this study, or the change of breeding strategy over the years. Over the years, more sheep will comply with the breeding goal and therefore culling because of inadequate exterior is less likely.

The ‘udder health problems’ as culling reason in the questionnaire can include a mild mastitis, a chronic mastitis or gangrenous mastitis. During the farm visits, farmers reported gangrenous mastitis apart from the other mastitis cases, but in this research no differentiation was made for different types of mastitis. Therefore, the number of culled ewes because of mastitis as found in the questionnaire might be underestimated, because farmers might have not mentioned the gangrenous mastitis as mastitis case.

With the univariable analyses, only for farm size a significant association with mastitis related culling from the total ewes lambed on the farm was found. Farms with 25 or more

ewes lambing per year had a significantly higher mastitis related culling rate. This could have something to do with the ease of culling in larger farms, when a lot of other ewes are staying. Emotional value of ewes at hobby farms makes it more difficult to cull animals on small hobby farms, and therefore the mastitis related culling percentage in farms with less than 25 animals lambing per year could be smaller.

In this study, an association between taking preventive measures or not was not found, but more research on this needs to be done to try to find some preventive measures reducing the risk of mastitis related culling in meat sheep. The preventive measures need to be individually investigated. In this study, the different preventive measures were all in the same group, and some preventive measures were only mentioned by 1 farmer. Therefore, it was not possible to find a significant association while it might exist. Effective preventive measures could reduce the mastitis related culling on meat sheep farms and make the farms more profitable.

The preventive measures mentioned by the farmers were very diverse and some are contradictory, as for instance some farmers mentioned early weaning and others late weaning. Different understanding of the causes of mastitis could be the base of this difference in preventive measures taken. Also 29 out of 99 respondents answered not to take preventive measures, some mentioning there is no preventive measure known so far. Most mentioned preventive measures were hygiene and sober feeding. In the study from Arsenault et al. (2008), litter size ≥ 3 lambs was found as risk factor for a higher incidence of clinical mastitis in meat-sheep flocks (Arsenault et al. 2008). A study from Waage and Vatn (2008) found increasing odds for clinical mastitis in ewes with one lamb when age was increasing. Also dystocia was, in ewes with one lamb, associated with increasing odds for clinical mastitis (Waage et al. 2008). Weather influences were mentioned by farmers, suggesting climate is a factor with a possible association with mastitis in sheep. As climate in a shed theoretically can be regulated, it might be possible to eliminate weather influences as a risk factor for mastitis related culling in ewes. Therefore it would be interesting to investigate the effect of weather conditions on the incidence of mastitis, and develop an advice for climate control for housing of sheep, as is done for dairy cows (Shathele 2009).

Besides all the culling reasons in the checkboxes, still 22% of respondents had checked “other culling reasons”. It is possible another more common reason for culling was overlooked, or the 22% is made up of a lot of different other less important culling reasons. Therefore another study specified on all culling reasons and their contribution to the total culling rate is recommended.

Although a pilot test with 6 farmers was performed on the questionnaire, and the questionnaire was designed to be as specific as possible, misunderstandings cannot be fully prevented or identified. An example of this is the total percentage of culled animals. It is based on the total ewes that lambed in the past 12 months according to the farmer. The questionnaire specifically asked about the ewes that had lambed in the past 12 months, but it is not certain that all farmers gave information about only these animals in this specific period. The comments on the questionnaire showed not all farmers were aware of this specification.

In the results of the questionnaire, information derived from the 6 farm visits was included. During the farm visits the questions were asked in the same form as the online questionnaire,

and therefore the answers can be included in the overall results. The farm visits were performed by the same person on all farms, so variation is not due to different interviewers.

Conclusions

Udder health problems is the most common reason for culling ewes on meat sheep farms in The Netherlands. The contribution of mastitis to culling ewes on meat sheep farms in The Netherlands is on average 41% and that makes mastitis of even more interest for the meat sheep industry. As only for farm size a significant association with mastitis related culling from the total ewes lambed on the farm was found, other possible risk factors might be worth the investment of investigation.

This study shows high culling rates in meat sheep and identifies udder health problems as the most important reason for culling, suggesting that udder health control may be important in lowering replacement rates and thus may increase the profitability of sheep farming.

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Appendices

Appendix 1: Questionnaire in Dutch

Enquête afvoerredenen en uiergezondheid vleesschapen

Deze enquête is opgesteld in het kader van een onderzoek naar de rol van uierontsteking bij de afvoer van vleesschapen in Nederland. Wilt u de enquête invullen over uw koppel Texelaar ooien?

Wat is het UBN van uw bedrijf? *

Korte antwoordtekst

Geeft u toestemming om de gegevens die u in deze enquête invult te koppelen aan informatie die over uw bedrijf bekend is bij NSFO? *

Als u geen toestemming geeft, worden alleen de gegevens die u in deze enquête invult gebruikt voor onderzoeksdoeleinden.

- ○ Ja
- ○ Nee

Welke van onderstaande kenmerken passen volgens u bij een uierontsteking? *

U mag meerdere opties aanvinken.

- [ ] Warm uier
- [ ] Rood uier
- [ ] Gezwollen uier
- [ ] Pijnlijk uier
- [ ] Bonken in het uier
- [ ] Afwijkende melk
- [ ] Afwijkend gedrag ooi
- [ ] Overige...

Op welke wijze stelt u vast dat een ooi uierontsteking heeft?

Korte antwoordtekst

Op welke momenten controleert u de uiers van uw ooien? *

- [ ] Voor de ram erbij gaat
- [ ] Na de geboorte van de lammeren
- [ ] Voor het spenen
- [ ] Na het spenen
- [ ] Als ik een afgezonderd schaap zie / een schaap met afwijkend gedrag zie
- [ ] Overige...

Wat onderneemt u om te voorkomen dat uw ooien uierontsteking krijgen?

Korte antwoordtekst

De volgende vragen gaan over aantallen ooien op uw bedrijf en de afvoer van ooien

Beschrijving (optioneel)

Hoeveel ooien hebben in de afgelopen 12 maanden op uw bedrijf gelammerd? *

Korte antwoordtekst

Wat was in deze afgelopen 12 maanden het gemiddeld aantal lammeren per worp per ooi? *

Korte antwoordtekst

Hoeveel van deze ooien heeft u de afgelopen 12 maanden van het bedrijf afgevoerd voor het leven (fokkerij, verkoop voor andere reden dan de slacht)? *

Als u het antwoord niet weet, zou u dan een schatting willen invullen?

Korte antwoordtekst

Hoeveel van die ooien die in de afgelopen 12 maanden hebben gelamd, zijn ook in de afgelopen 12 maanden van het bedrijf afgevoerd, omdat ze naar de slacht gingen, dood zijn gegaan of zijn geëuthanaseerd? *

Als u het antwoord niet weet, zou u dan een schatting willen invullen?

Korte antwoordtekst

Volgens ons is een uierontsteking al gaande bij de aanwezigheid van één of meerdere van de volgende symptomen: afwijkingen aan het uier (rood, warm, gezwollen/harde stukken, pijnlijk) en/of afwijkingen in de melk (waterig, vlokken, bijmengingen van bloed). Hoeveel van de ooien die zijn afgevoerd omdat ze naar de slacht gingen, dood zijn gegaan of zijn geëuthanaseerd hadden bij uw weten een uierontsteking volgens bovenstaande beschrijving? *

Als u het antwoord niet weet, zou u dan een schatting willen invullen?

Korte antwoordtekst

Naast de afvoer van slachtlammeren en de verkoop voor het leven, om welke redenen heeft u de afgelopen 12 maanden ooien van uw bedrijf afgevoerd? *

- [ ] Uierproblemen
- [ ] Vruchtbaarheidsproblemen: o.a. weinig productie(lammeren of melk), niet drachtig te krijgen
- [ ] Algemeen ziek schaap of ouderdom
- [ ] Gebitsproblemen / Proppenkauwer
- [ ] Dood in het land / verdronken etc.
- [ ] Moeizame geboorte van de lammeren
- [ ] Foktechnisch niet tevreden / Exterieur bevalt niet
- [ ] Kreupelheden
- [ ] Karakter (/onvriendelijk/onhandelbaar dier)
- [ ] Overige...

De volgende vragen hebben betrekking op de voeding van uw ooien

Beschrijving (optioneel)

Hoeveel gram krachtvoer voert u een ooi in de eerste week na het lammeren per zogend lam per dag? Als u geen krachtvoer voert na het lammeren, vult u 0 in. *

Korte antwoordtekst

Hoeveel weken na het lammeren stopt u met het voeren van krachtvoer aan uw ooien? *

- ( ) Binnen 4 weken na het aflammeren
- ( ) Na 5 - 9 weken na het lammeren
- ( ) Na 9 - 12 weken na het lammeren
- ( ) Ik voer 12 weken na het lammeren nog steeds krachtvoer aan mijn ooien
- ( ) Ik voer geen krachtvoer aan mijn ooien

Hoeveel weken na het lammeren gaan de ooien en hun lammeren naar buiten? Vul een rond getal in.

Korte antwoordtekst

Afronding enquête

Beschrijving (optioneel)

Hieronder is ruimte voor vragen of opmerkingen over deze enquête of over het onderzoek in het algemeen.

Korte antwoordtekst

Als u interesse heeft in de resultaten van dit onderzoek, dan mag u uw e-mailadres invullen. We zullen u benaderen als het onderzoek is afgerond.

Hartelijk bedankt voor uw medewerking!

Korte antwoordtekst

Appendix 2: Questionnaire translated in English

Survey udder health and culling reasons meat sheep ewes

This survey is made for a research on the role of mastitis in culling ewes on meat sheep farms in The Netherlands. Will you provide information about your flock Texel ewes?

What is the unique farm number of your farm? *

Korte antwoordtekst

Do you give permission to link the data you provide in this survey to the data of your farm which is already known by NSFO? *

Without your permission, only the data you provide in this survey will be used for research purposes.

- ○ Yes
- ○ No

Which of the following features is seen with mastitis? *

You can choose multiple answers.

- [ ] Warm udder
- [ ] Red udder
- [ ] Swollen udder
- [ ] Painful udder
- [ ] Hard parts in udder
- [ ] Abnormal milk
- [ ] Abnormal behaviour ewe
- [ ] Other

How do you ascertain an ewe has mastitis?

Korte antwoordtekst

Which moments do you use to check the udders of your ewes? *

- [ ] Before the ram is with the ewes
- [ ] After the birth of the lambs
- [ ] Before weaning
- [ ] After weaning
- [ ] When I see an ewe is separated from the group or has abnormal behaviour
- [ ] Other

What measures have you taken to prevent mastitis?

Korte antwoordtekst

The following questions are about the numbers of ewes on your farm and about culling

Beschrijving (optioneel)

How many ewes have had lambs on your farm in the past 12 months? *

Korte antwoordtekst

What is the average number of lambs born per litter per ewe in these past 12 months? *

Korte antwoordtekst

How many of these ewes did leave the farm to stay alive (breeding purposes, other reasons than sold to slaughterhouse) *

If you do not know the answer, please give an estimate.

Korte antwoordtekst

How many of these ewes that have lambed in the past 12 months, have been culled in these past 12 months, because they went to slaughterhouse, died or had to be euthanized? *

If you do not know the answer, please give an estimate.

Korte antwoordtekst

We think mastitis is present when one or more of the following symptoms are present: abnormalities in udder (red, warm, swollen, hard parts, painful) and/or abnormalities in the milk (aqueous, flakes, a mixture of blood). How many of these ewes that have been culled because they went to slaughterhouse, died or had to be euthanized have had mastitis according to these symptoms as described above? *

If you do not know the answer, please give an estimate.

Korte antwoordtekst

Besides removal of slaughter lambs and selling animals to stay alive, which reasons for culling ewes did you have in the past 12 months? *

- [ ] Udder problems
- [ ] Fertility problems: low production (lambs or milk), not pregnant
- [ ] General health sheep or age
- [ ] Dental problems
- [ ] Found dead in pasture, drowned
- [ ] Difficulty with lambing
- [ ] Exterior dissatisfied, not suitable for breeding
- [ ] Lameness
- [ ] Personality/ unruly ewe
- [ ] Other

The following questions are about feeding your ewes

Beschrijving (optioneel)

How much concentrate feeding do you give your ewes in the first week after lambing, per suckling lamb per day? If you don't feed concentrate feeding after lambing, place 0. *

Korte antwoordtekst

How many weeks after lambing do you stop feeding concentrate feeding to your ewes? *

- Within 4 weeks after lambing
- Between 5 - 9 weeks after lambing
- Between 9 - 12 weeks after lambing
- Over 12 weeks after lambing
- I don't feed concentrate feeding at all

How many weeks after lambing are the ewes and their lambs able to go out in the fields?

Korte antwoordtekst

Completion survey

Beschrijving (optioneel)

You can place any questions or suggestions about the survey or the research in the box below.

Korte antwoordtekst

If you are interested in the results of this research, you can leave your e-mail address. We will contact you when the research is finished.

Thank you for your cooperation!

Korte antwoordtekst