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Influence of breed, farm, age at first lambing and number of lambing on length of productive life in sheep

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Introduction

Length of productive life (LPL)

- Life performance of female sheep important economic trait in sheep husbandry
- An increased LPL reduces proportional rearing costs
- LPL is an indicator for animal health and an optimized husbandry

Objective:

calculate length of productive life in sheep and specify effects influencing LPL

Material and methods

- Records supplied by the Sheep Breeders Association Schleswig-Holstein
- Observation period between January 1992 and October 2008
- Data information: breed, farm, type and date of birth, culling date, date of first and following lambings, total number of lambings and lambs in lifetime of each breeding ewe
- In total 15,967 records were included in the analysis

Material and methods

- Survival analysis was performed using the Software package SURVIVAL KIT Version 3.12

- Definition LPL:
  - Days between date of first lambing and date of culling or death

- Data were considered as censored (n = 3,686) when
  - sheep were still alive at the end of the observation period (n = 2,706)
  - sheep had an interval between last lambing and end of observation period exceeding 800 days (n = 756)
  - sheep had more than eight lambings (n = 224)

Material and methods

$$\Lambda(t) = \Lambda_0(t) * \exp \{B_i + AFL_j + TYP_k + LNR_l(t') + HY_m(t'')\}$$

$\Lambda(t)$:	hazard function
$\Lambda_0(t)$:	baseline hazard function
B_i:	breed (German Whiteheaded Mutton, German Blackheaded Mutton, Texel, Suffolk, other breeds)
AFL_j:	age at first lambing (<395, 395-<455, 455-<730, ≥730 days)
TYP_k:	type of birth of the ewe (single, twin, multiple)
$LNR_l(t')$:	combined variable number of lambing (1 – ≥8) * classification of lambs born (1: single, 2: multiples)
$HY_m(t'')$:	herd-year (m = 1,…, 2 836)

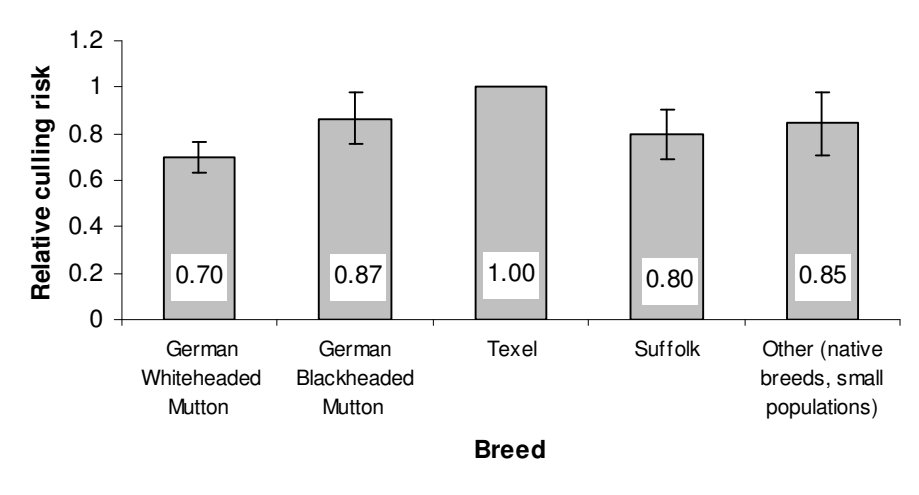
Results

Characteristics of the data set concerning length of productive life (LPL), animal and performance parameters

	n	$\bar{x}$	s
LPL (uncensored, days)	12,281	1,188	724
LPL (censored, days)	3,686	1,389	883
age at first lambing (days)	15,967	548	181
number of lambings	15,967	3.2	1.9
number of lambs born	15,967	6.0	4.0
lambs each lambing	15,967	1.8	0.4
age at culling or death (days)	15,967	1,783	775

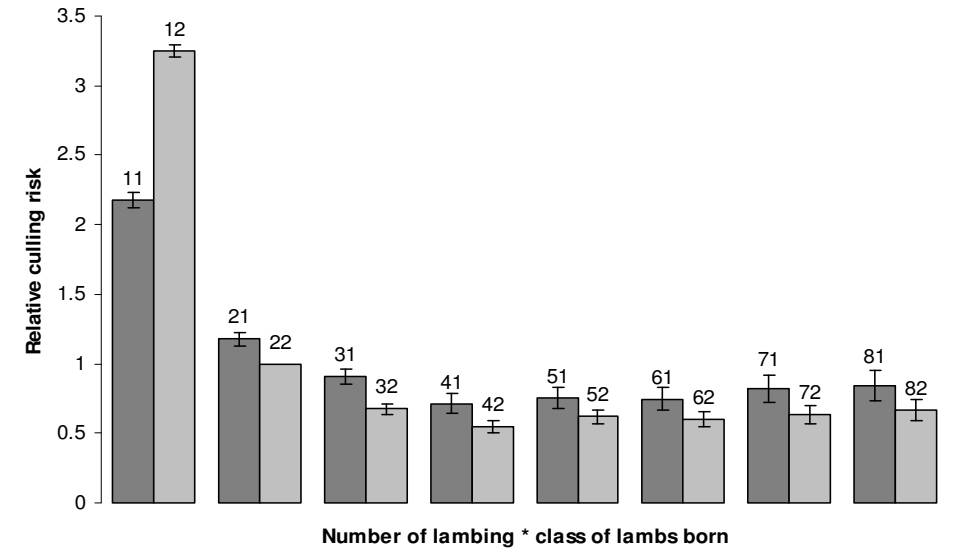
Results

Relative culling risk and the standard error for the effect of the breed (p<0.001)



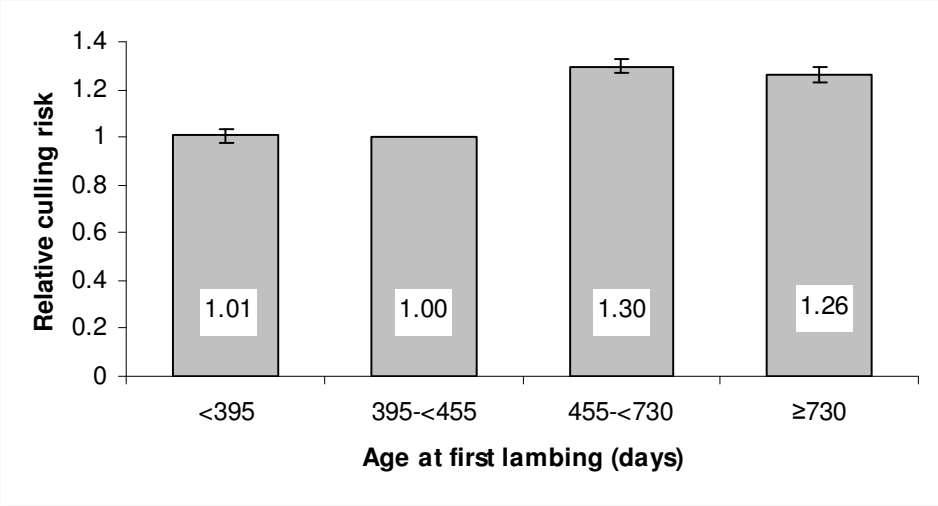
Results

Relative culling risk and the standard error of the combined effect of number of lambing and number of lambs (1: single; 2: multiples) born each lambing (p<0.001)



Results

Relative culling risk and standard error for the effect of age at first lambing (p<0.001)



Conclusion

- The effect of breed, number of lambs each lambing, age at first lambing and herd-year have a significant influence on length of productive life
- An age at first lambing less than 455 days should be preferred
- The age of an ewe is not as important as their performance

Perspective:

- Analysis of a dataset from Lower-Saxony
- Comparison of both datasets
- Investigation of health, housing and management in sheep husbandry

Thank you very much for your attention