

Genetic evaluation of lamb survival in the conditions of the Czech Republic



M. Milerski, J. Schmidová, L. Vostrý

Institute of Animal Science, Prague - Uhřetěves



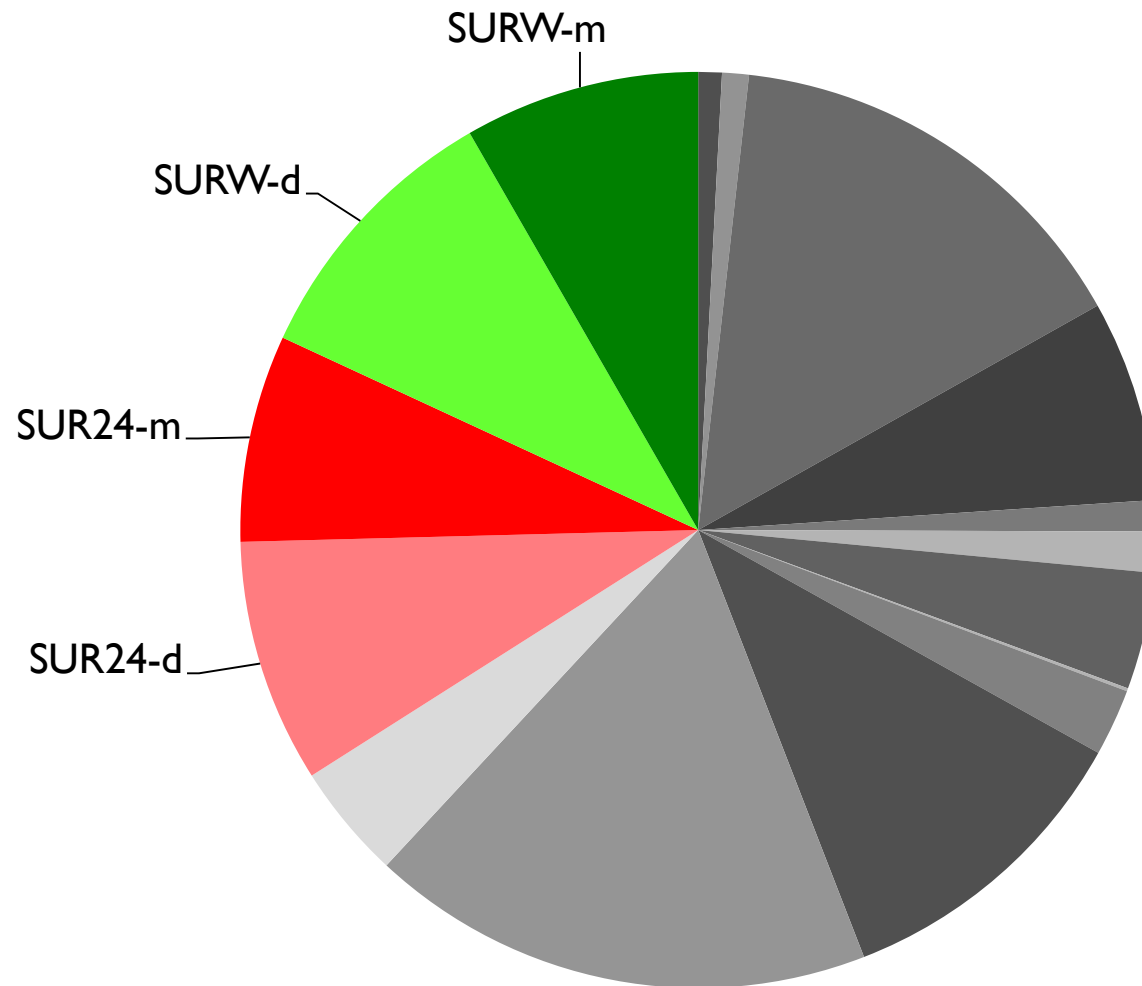
Lamb mortality



- **High economic importance**
- **Welfare**
 - Animals
 - Farmers

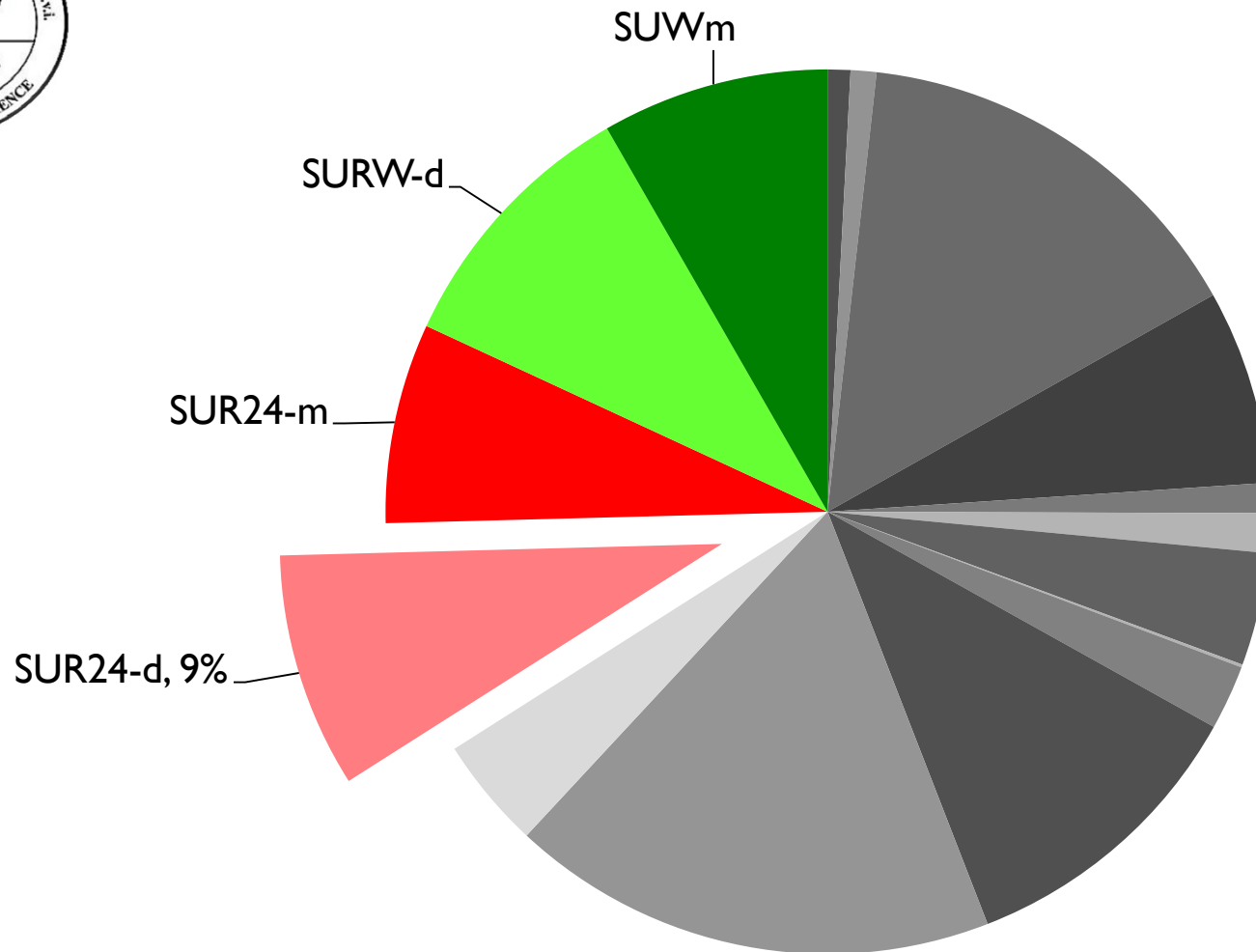


Relative economic values of lamb survival traits - ROMNEY



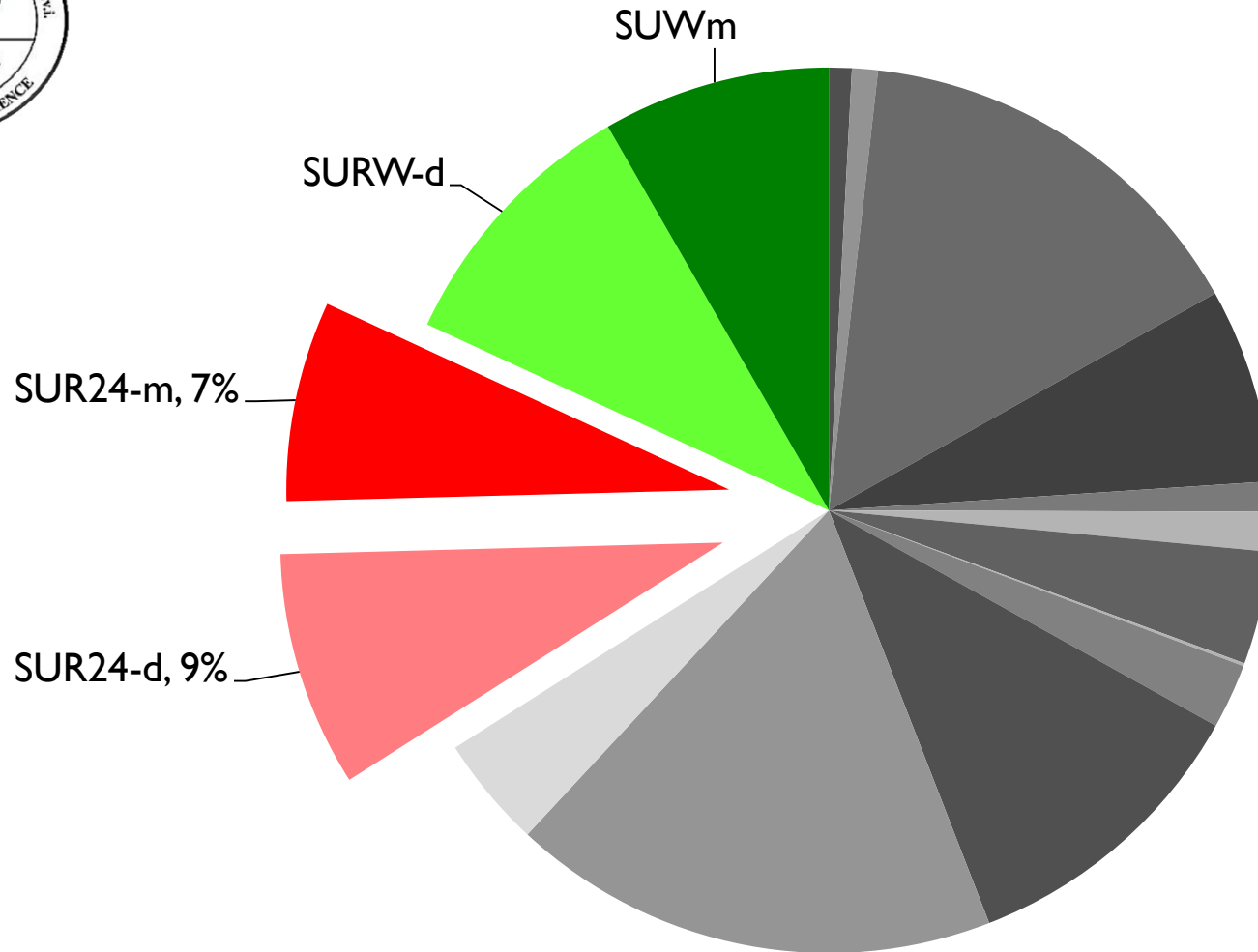
Wolfová et al., 2011

Relative economic values of lamb survival traits - ROMNEY



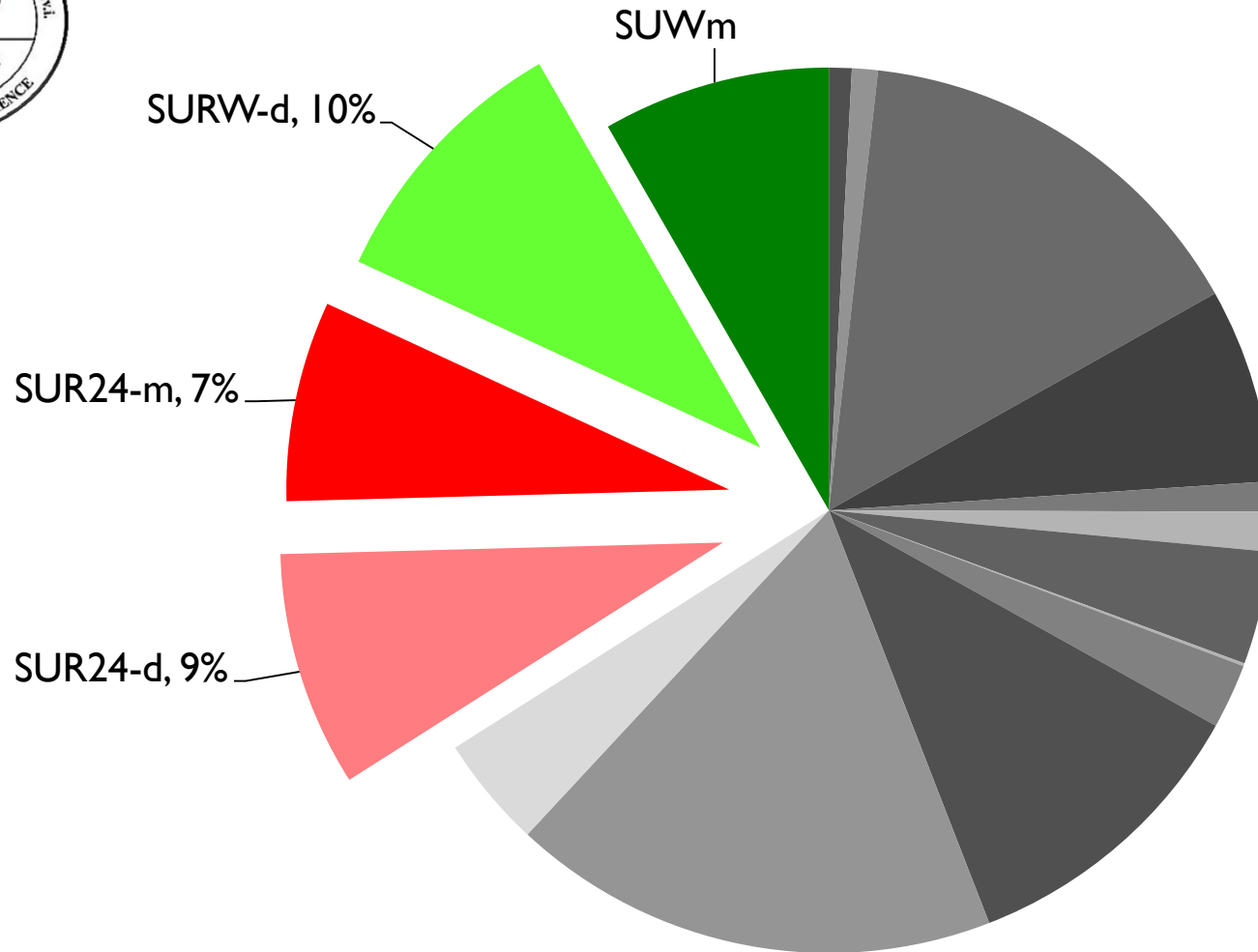
Wolfová et al., 2011

Relative economic values of lamb survival traits - ROMNEY



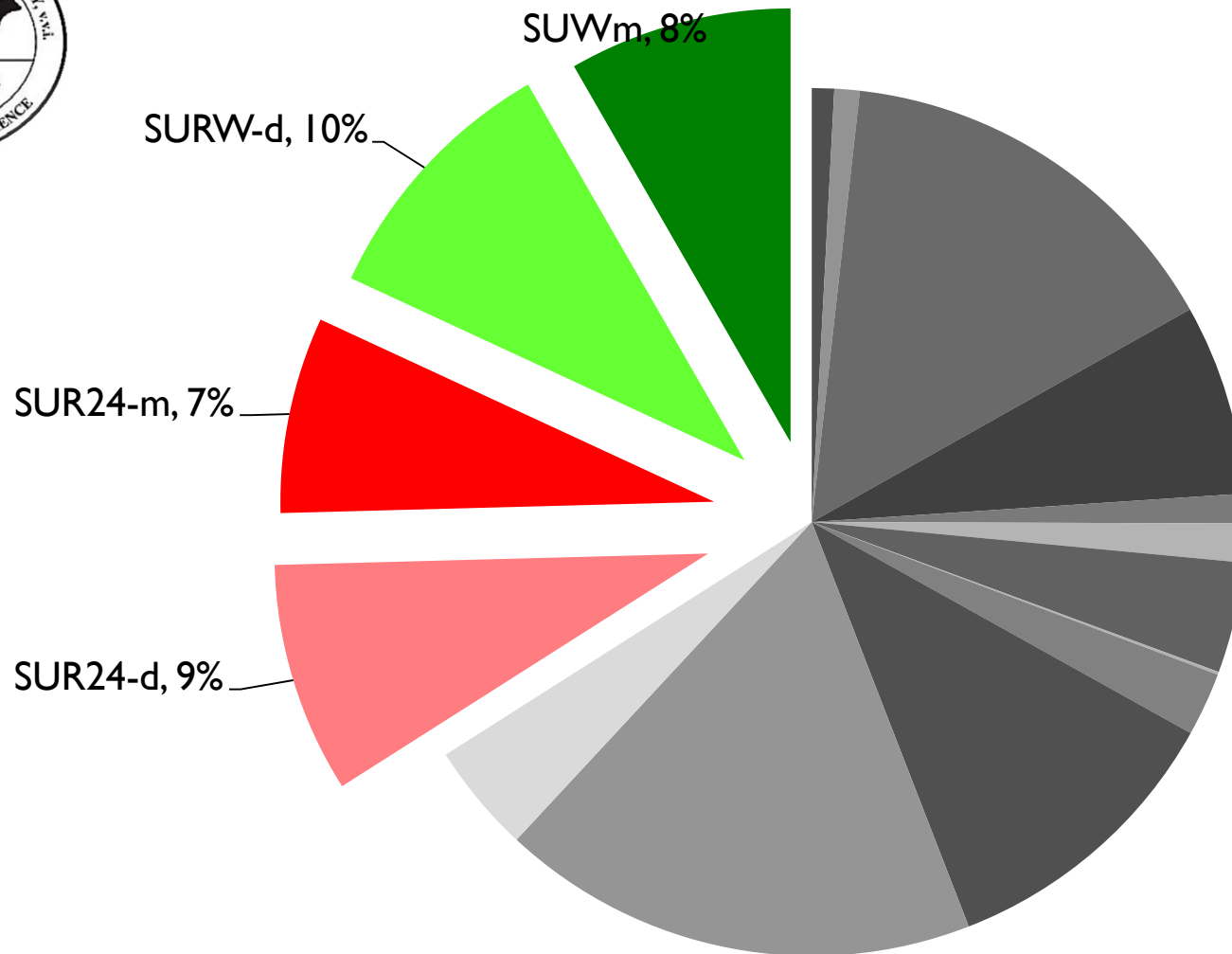
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Relative economic values of lamb survival traits - ROMNEY



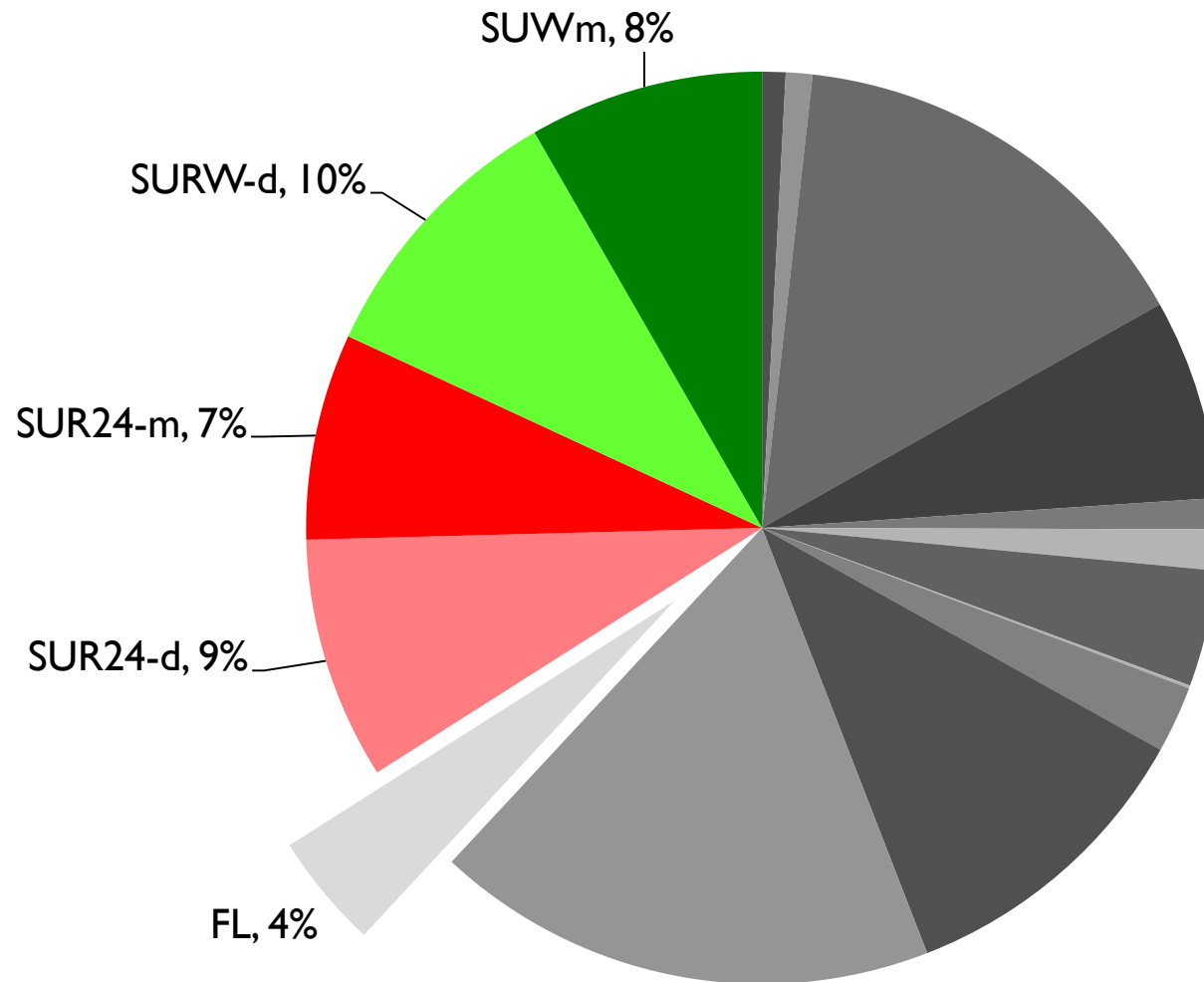
Wolfová et al., 2011

Relative economic values of lamb survival traits - ROMNEY



Wolfová et al., 2011

Relative economic values of lamb survival traits - ROMNEY



Wolfová et al., 2011

The most common causes of lamb mortality



- Dystocia
- Hypotermia
- Starvation
- Lamb abandonment
- Infections
- Injures
- Predators



The most common causes of lamb mortality



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birth weight



The most common causes of lamb mortality



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Udder shape
Milkability



The most common causes of lamb mortality



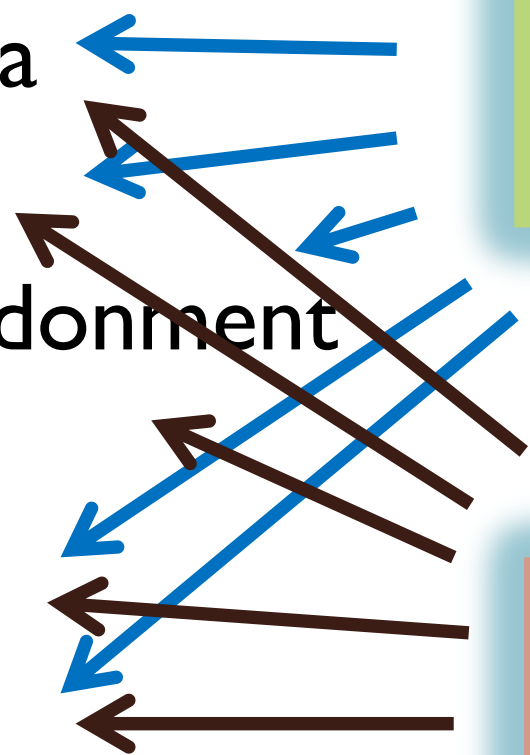
The most common causes of lamb mortality



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Behavior
Lamb

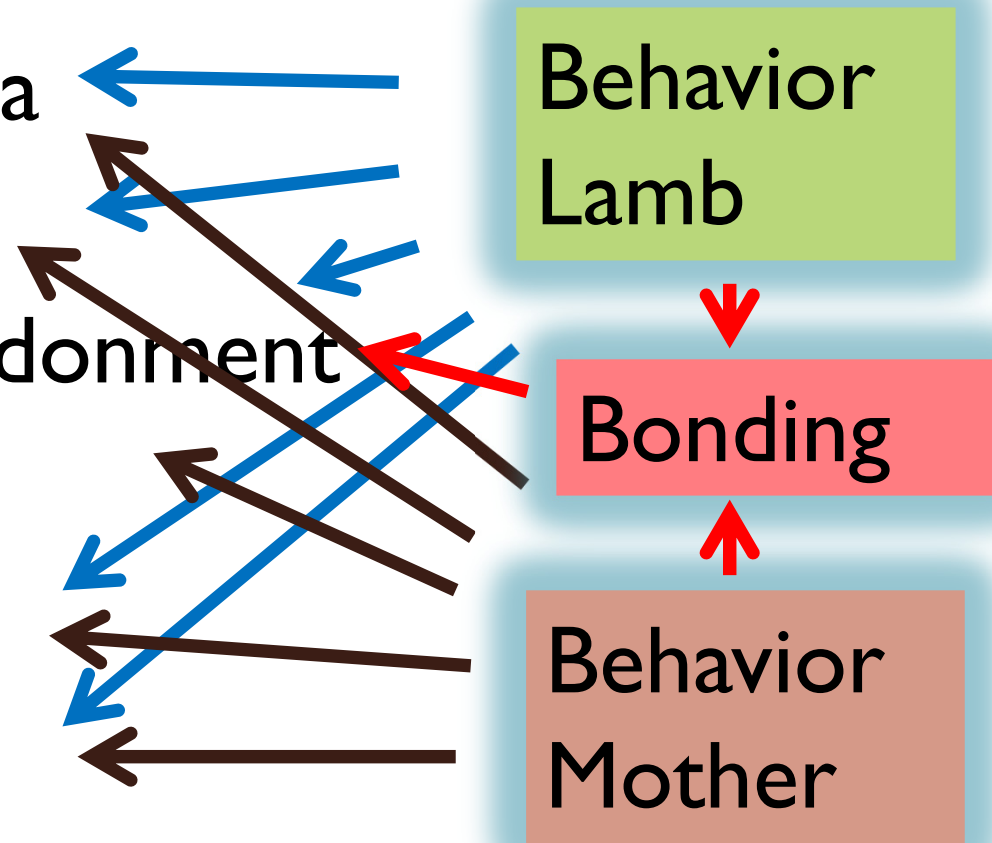
Behavior
Mother





The most common causes of lamb mortality

- Dystocia
- Hypotermia
- Starvation
- Lamb abandonment
- Infections
- Injures
- Predators



Ewe-lamb bonding



Ewe-lamb bonding













Goals



- Mortality rates in different sheep breed
- Effects influencing lamb survival
- Heritability of lamb survival

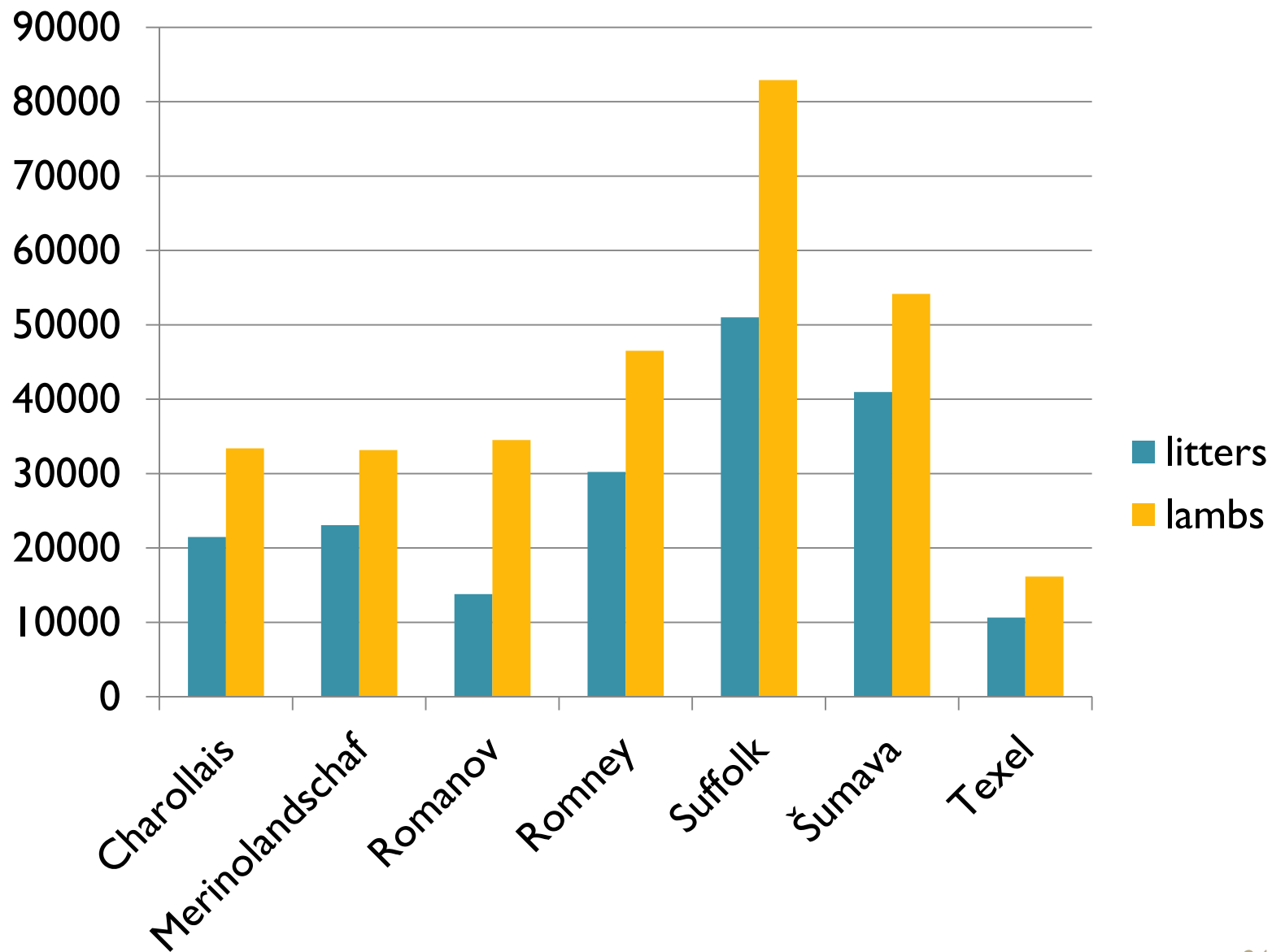




Data-set

- Records from official performance recording – Ass. of Sheep and Goats Breeders in the Czech Republic
- 1994-2014
 - Suffolk – **SF**
 - Romney – **RM**
 - Šumava – **S**
 - Texel - **T**
 - Charollais – **CH**
 - Romanov – **R**
 - Merinolandschaf – **ML**

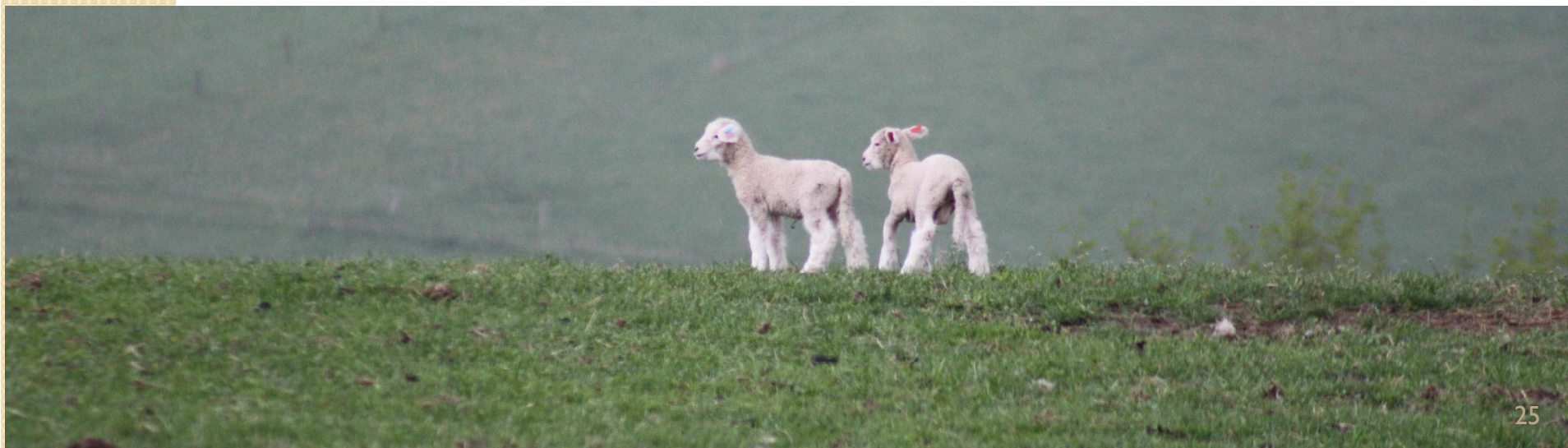
Numbers of records





Recorded characteristics

- Litter size
- No. of still-born and dead to 24h
- No. of lambs dead from 2nd to 14th day
- No. of lambs weighed at age 70-130 days





Evaluated traits

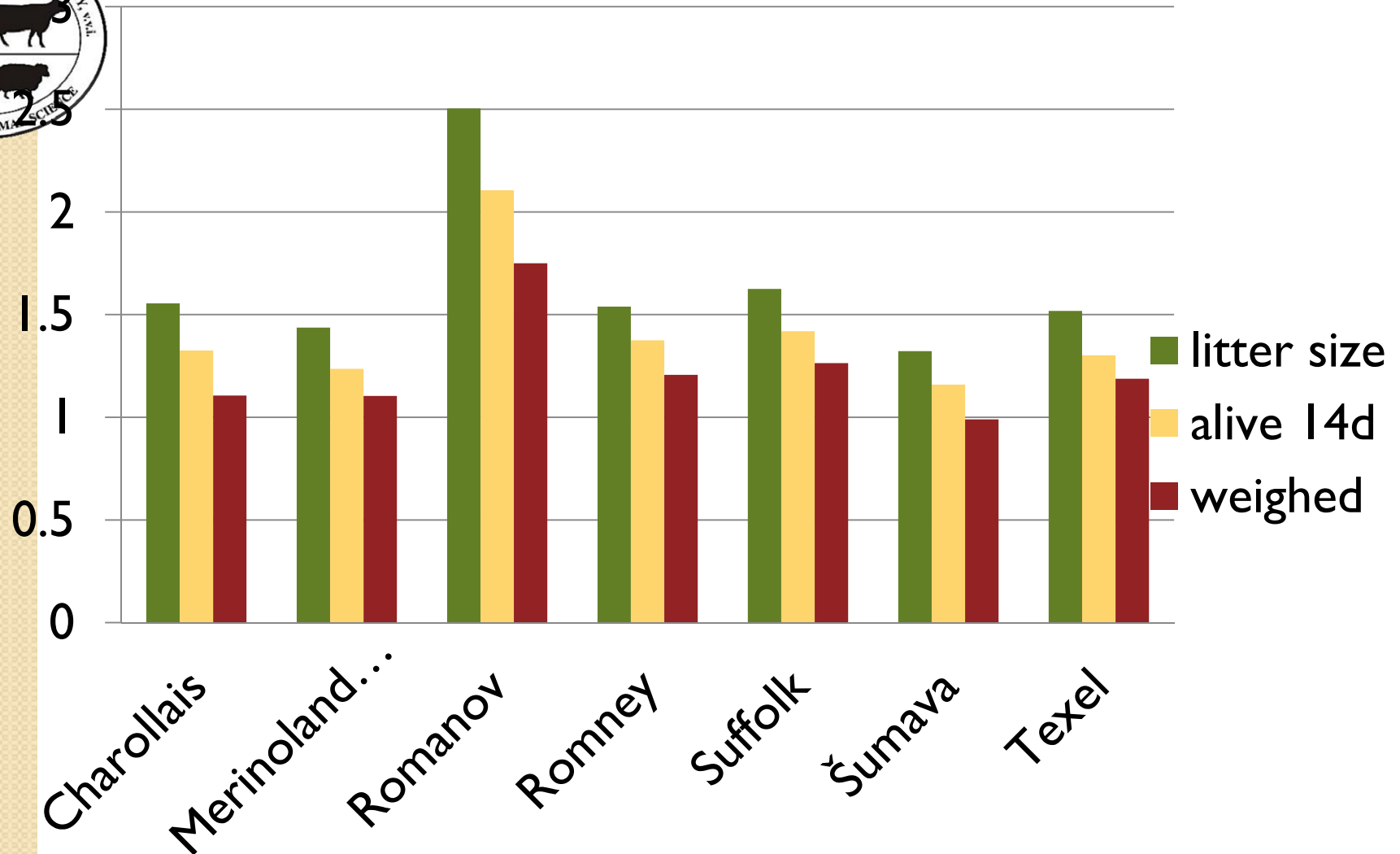
- Lamb traits
 - Perinatal survival - to 24h
 - Survival from 2nd to 14th day of age
- Mother traits
 - Litter size
 - Lambs in litter reared to 14th day of age
 - Lambs in litter weighed (70-130 days of age)



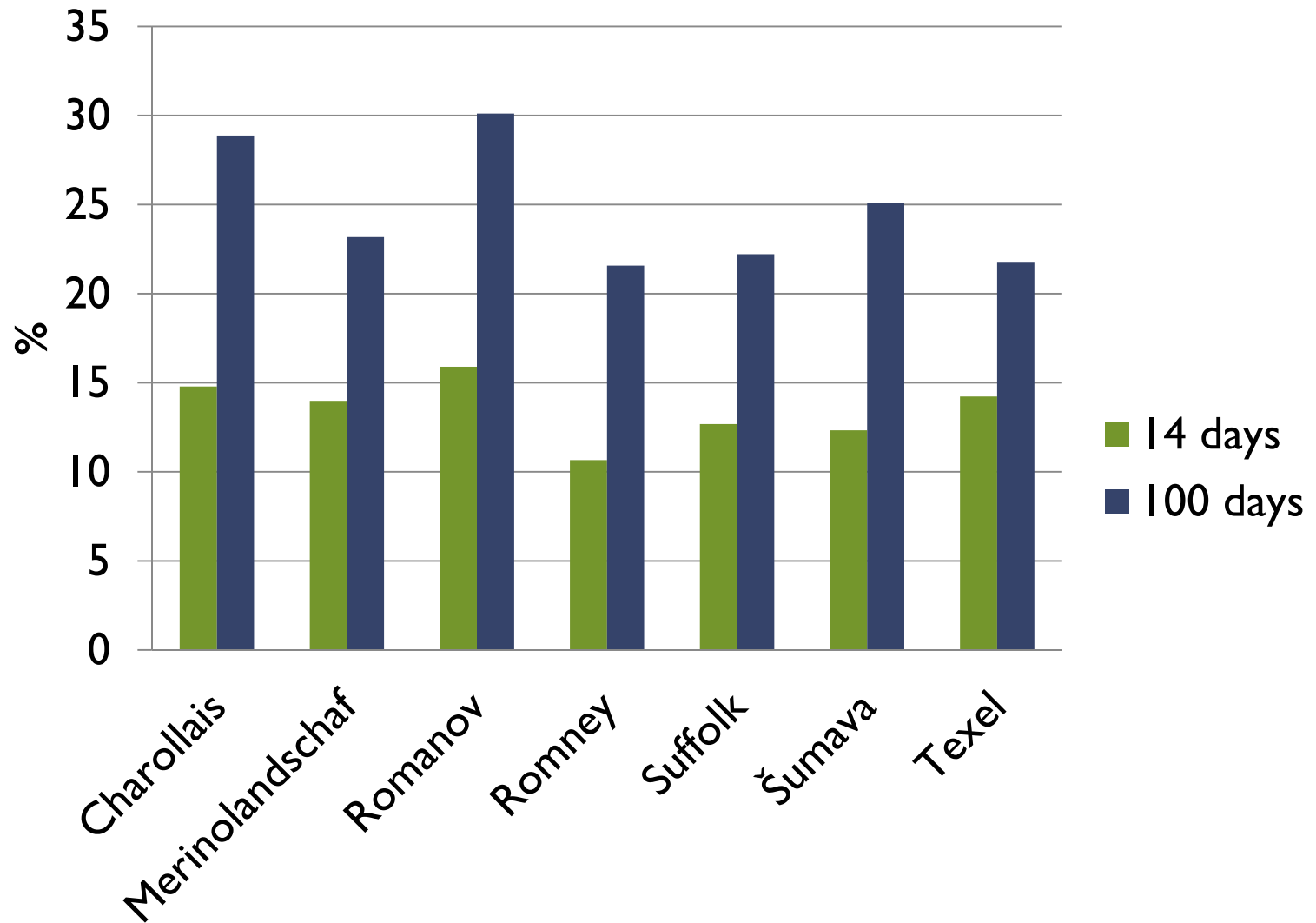
Means for number of lamb in litter at birth, 14d of age and weighing



lamb/litter



% of lamb losses



Statistical analysis – lamb traits



$$\log\left(\frac{\pi_{ijkl}}{1 - \pi_{ijkl}}\right) = Cg_i + AgeD_j + Sex_k + Litter_l + e_{ijkl}$$

Cg_i – contemporary group – random

$AgeD_j$ – age of dam - fixed

Sex_k – sex of lamb – fixed

$Litter_l$ – litter size – fixed

E_{ijkl} – random residual

Systematic effects:

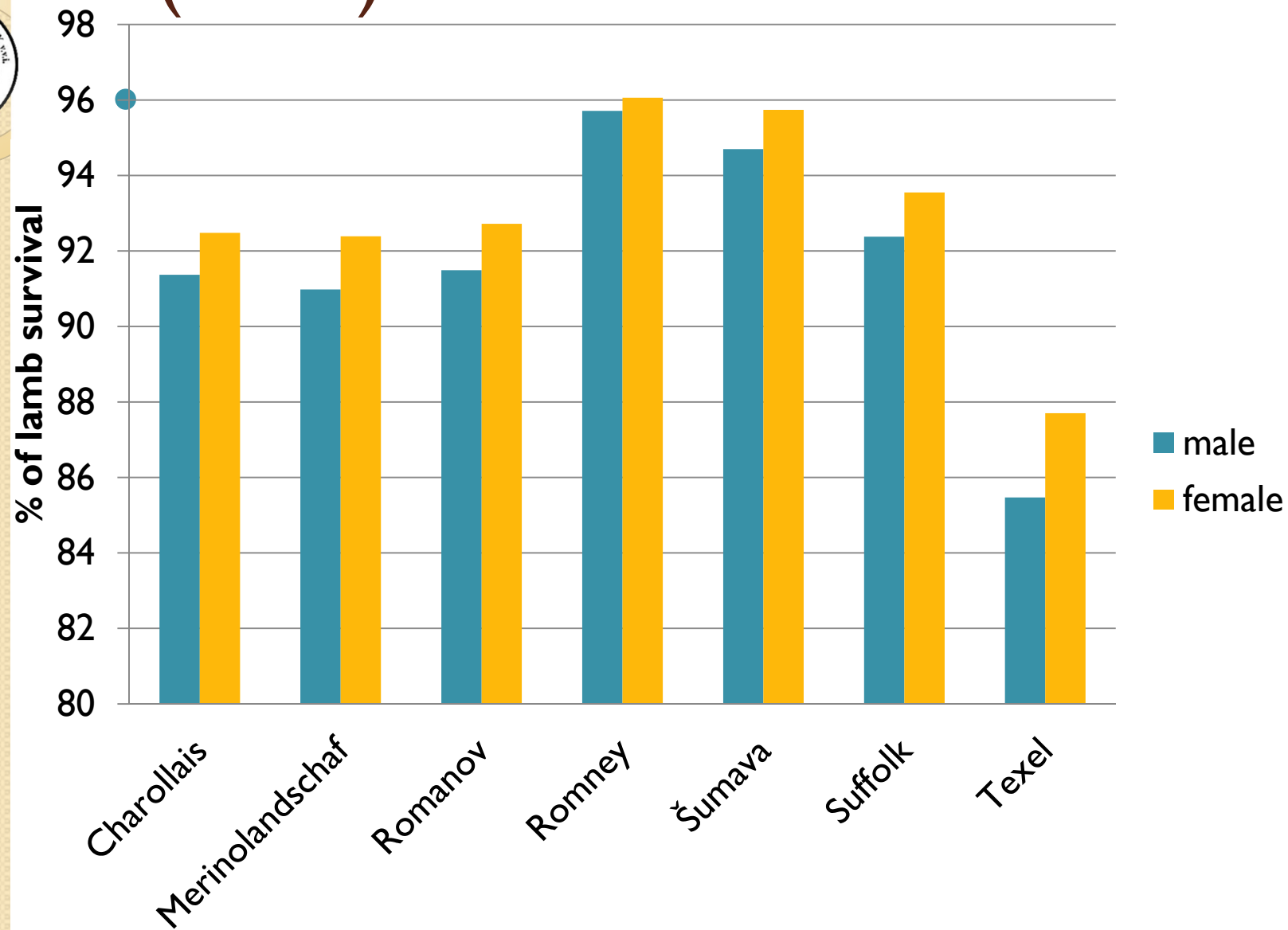
SAS GLIMMIX

Genetic paramters:

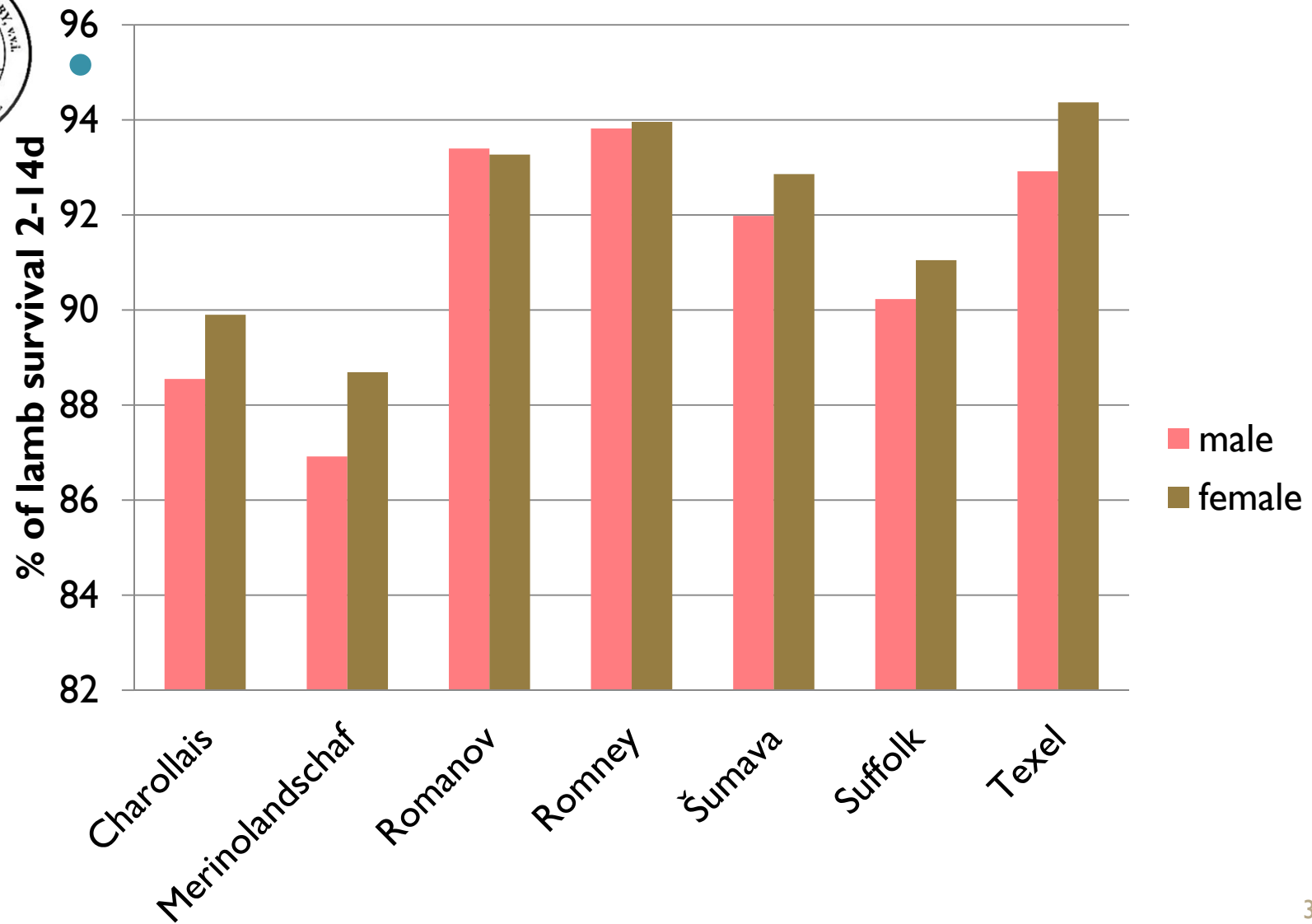
REML

DMU (Madsen and Jensen, 2008)

Lamb perinatal survival according to sex (LSMs)

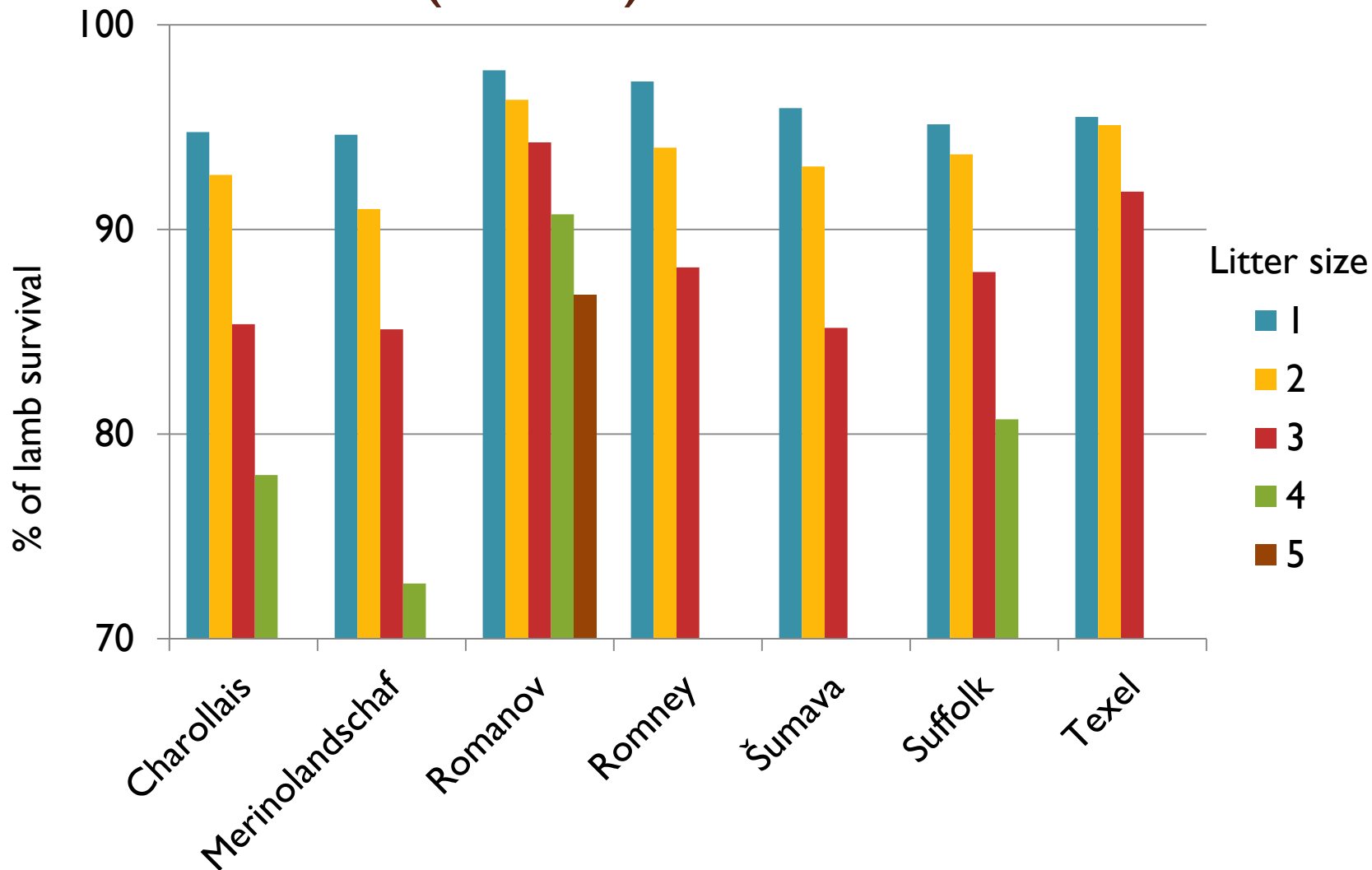


Lamb survival from 2nd to 14th day of age according to sex (LSMs)



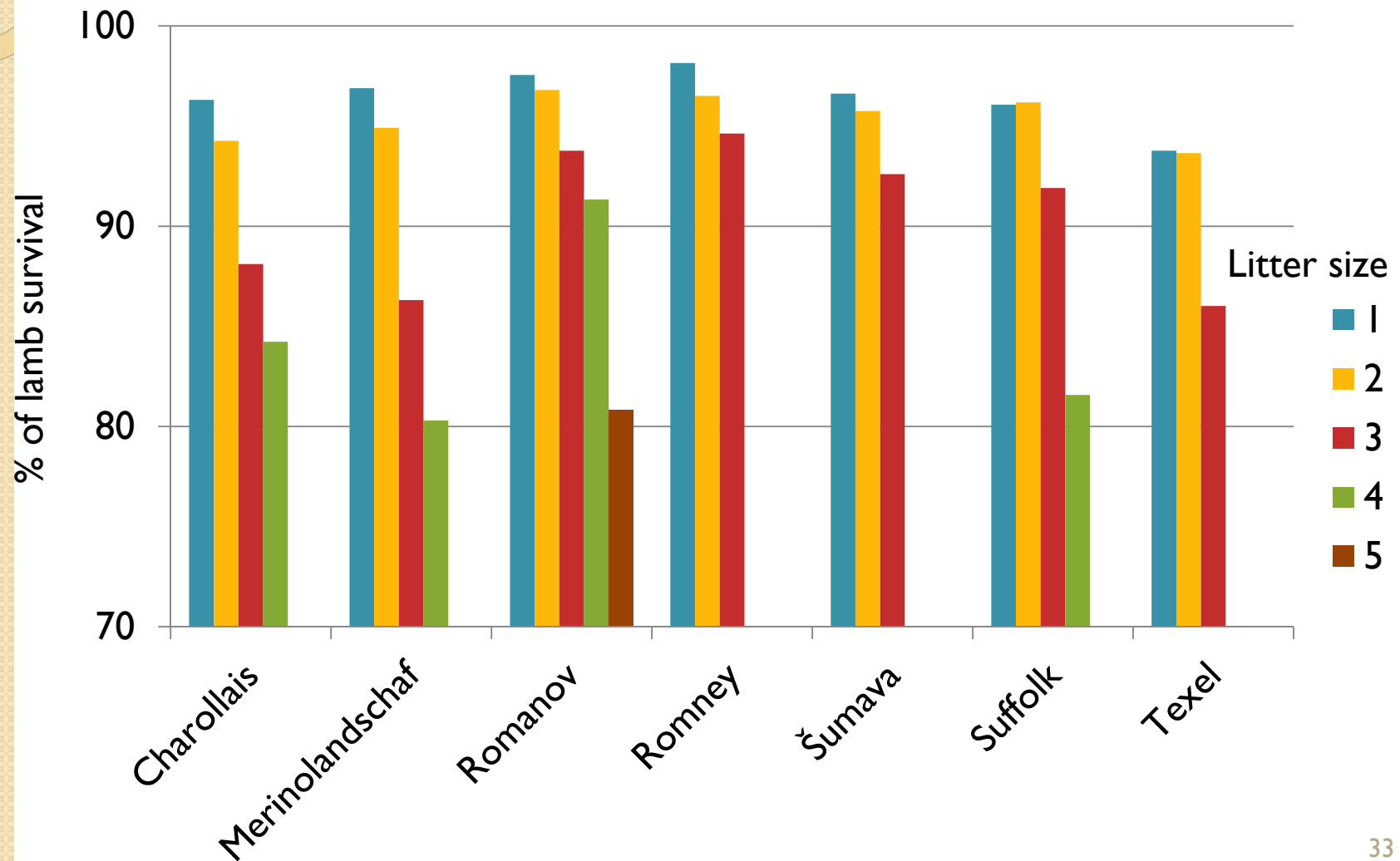


Lamb perinatal survival according to litter size (LSMs)



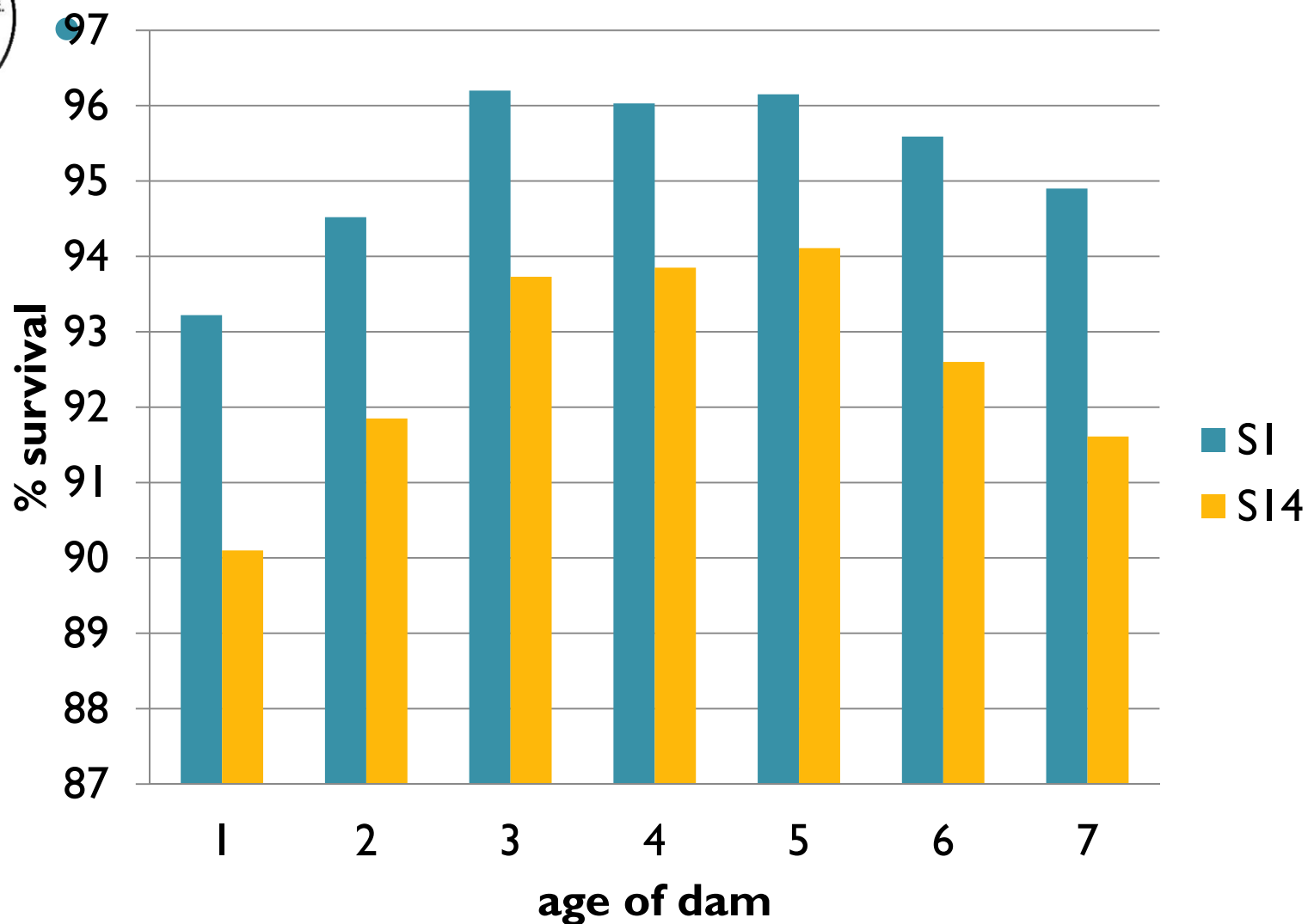


Lamb survival from 2nd to 14th day of age according to litter size (LSMs)



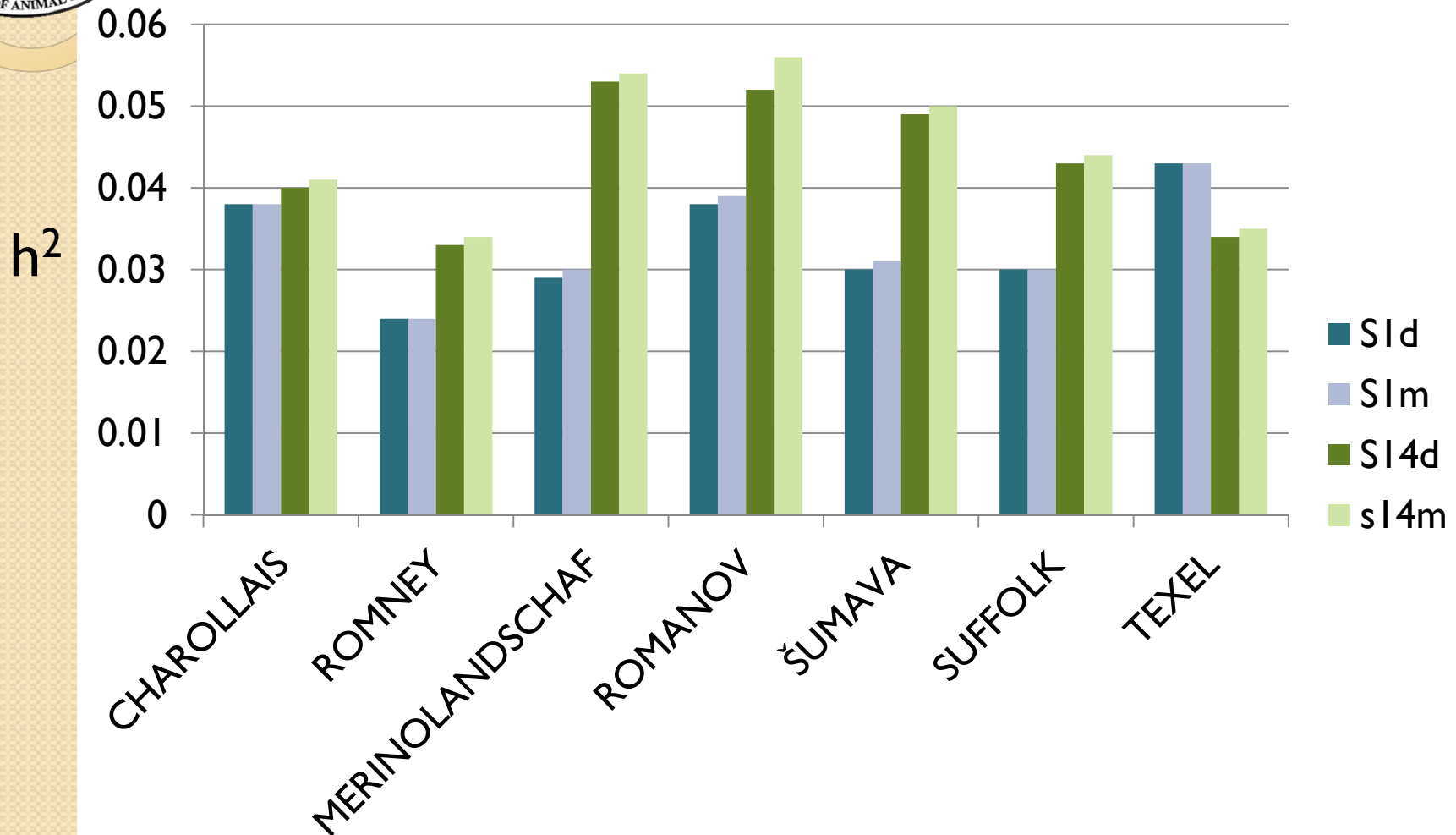
Lamb survival according to age of dam

SUFFOLK





Heritability of lamb survival





Statistical analysis – ewe traits

$$y_{ijkl} = Cg_i + AgeD_j + Pe_{ijk} + g_{ijk} + e_{ijkl}$$

Cg_i – contemporary group – random

$AgeD_j$ – age of dam - fixed

Pe_{ijk} – permanent environment of the ewe - random

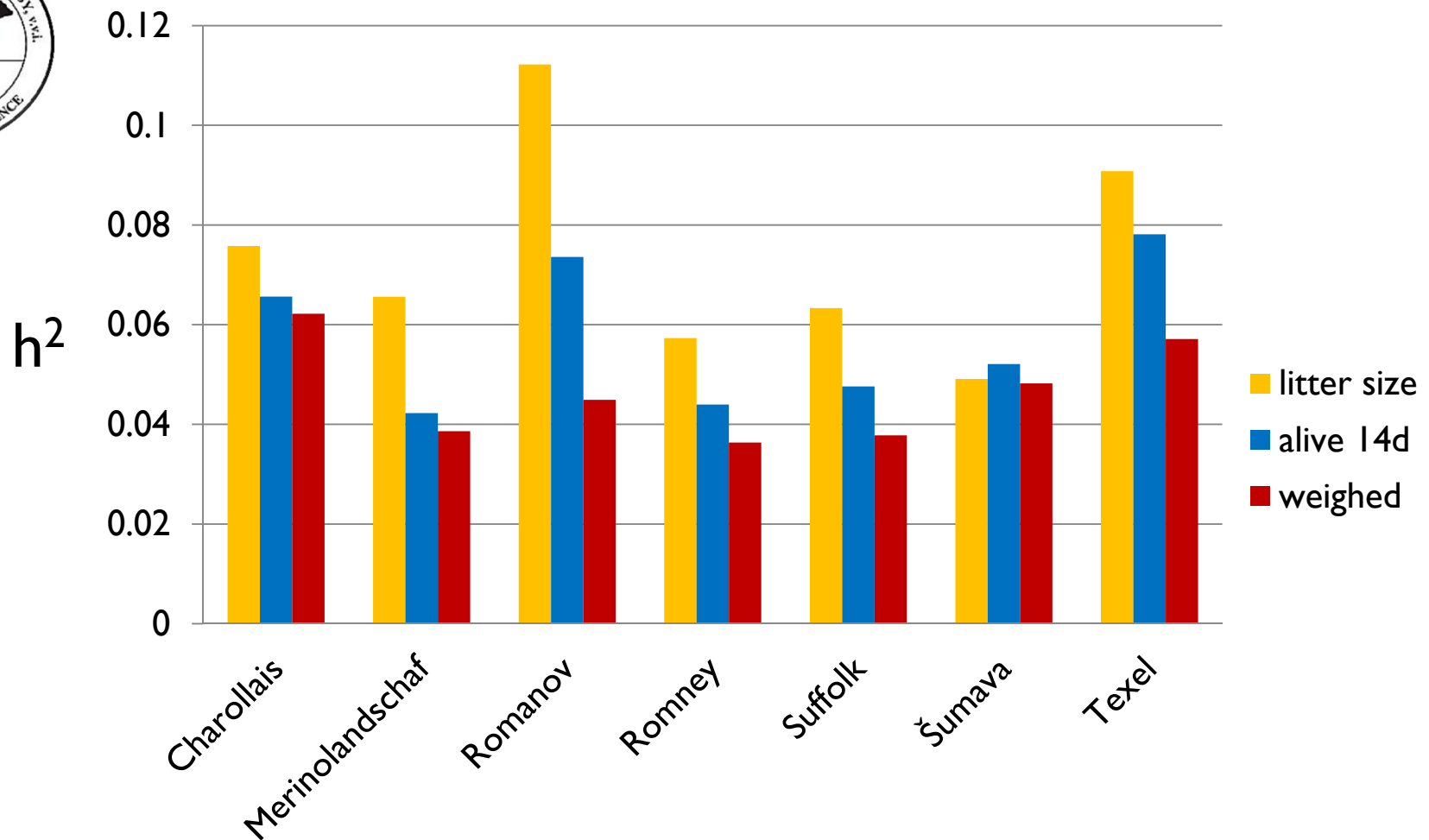
g_{ijk} – individual genetic effect - random

e_{ijkl} – random residual

Genetic parameters: **REMLf90**



Coefficients of heritability for number of lambs in litter at birth, 14 days and weighing





Summary

- **Lamb mortality rate in the CR** - high
- **Records** – available – not always reliable
- **Heritability** - very low
- **Economic importance** – high
- **Natural selection** – take place
- **Welfare aspects** – are present



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Lamb survival should be included into breeding programs for non-dairy sheep



Possibilities of indirect selection

- Birth weight of lamb
- Udder assessment in mother ewe
- Assessment of mother behavior during tagging







Thank you for your attention



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