SURVIVAL AND ADAPTABILITY OF INDIGENOUS RED MAASAI SHEEP AND THEIR CROSSES IN ARID LANDS OF EAST AFRICA IN THE FACE OF DRASTICALLY CHANGING CLIMATIC CONDITIONS

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ILRI
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

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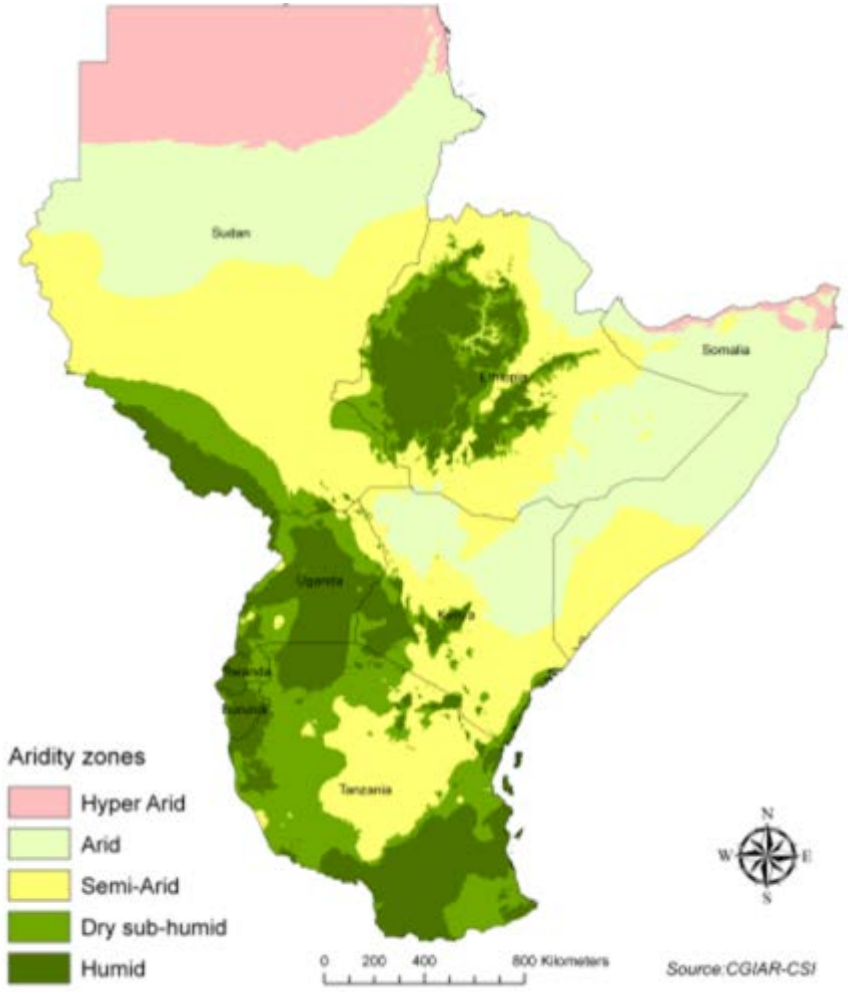
Scenario in the Arid lands of East Africa

- Climatic conditions in Eastern Africa are drastically changing
  - Increase in frequency and intensity of droughts
  - Spread of vector-borne diseases
  - Migration of people and animals in search of food and water
  - High mortalities of animals
  - Dependency of populations: Need for food aid

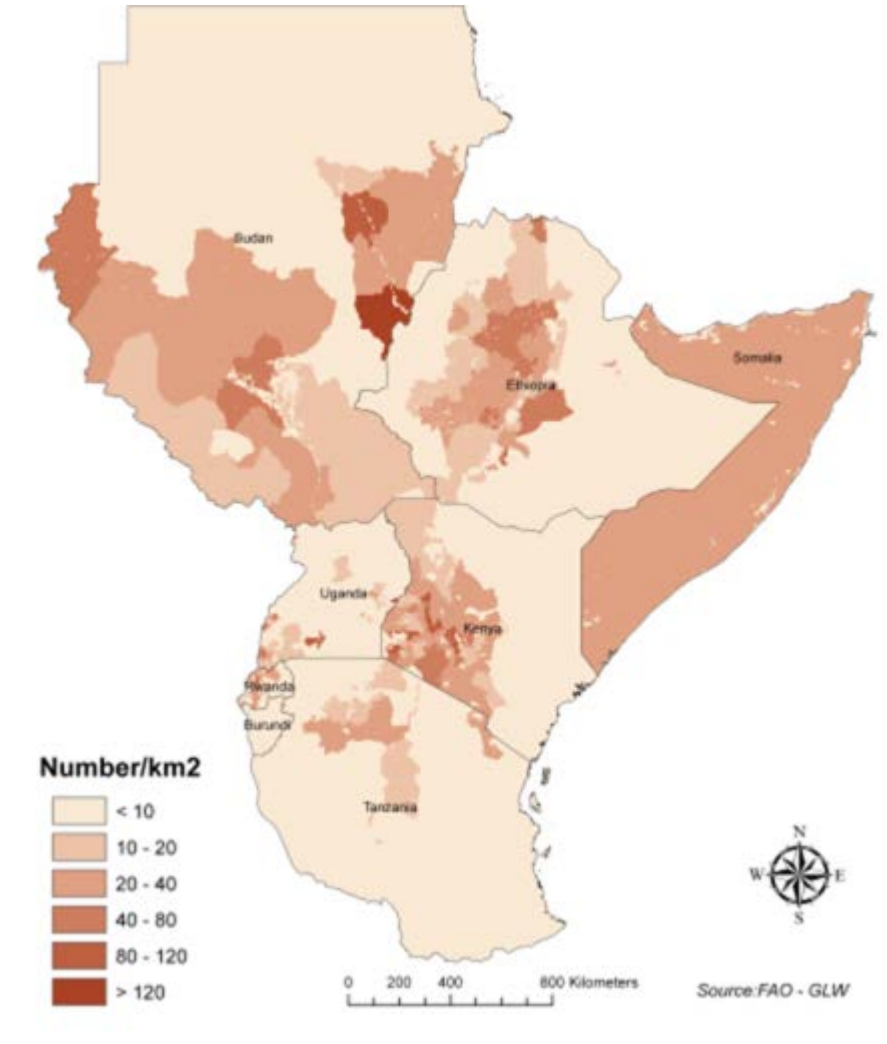
Questions that need to be addressed

- How can we reduce the vulnerability and increase the resilience of communities within arid areas?
- How can the assets of livestock keepers be secured?
- How can animal productivity within the rangelands be increased?

Environment and distribution of sheep in Eastern Africa



Spatial distribution of drylands in Eastern Africa



Distribution of Sheep in Eastern Africa

Main breeds studied

The Red Maasai

- Indigenous breed of East Africa
- Resistant to gastrointestinal infections
- Fat-tailed hardy animal, mainly reared for meat

The Dorper

- Imported from South Africa
- Meat breed
- Composite breed of Dorset and Blackhead Persian breeds

Red Maasai x Dorper

Objectives of selective breeding program at ILRI Kapiti ranch

- Optimize genetic gains in **growth**, **survival** and **reproductive traits**
- Guard against inbreeding
- Make animals available to livestock keepers for improved sheep production **under pastoral systems**

Data

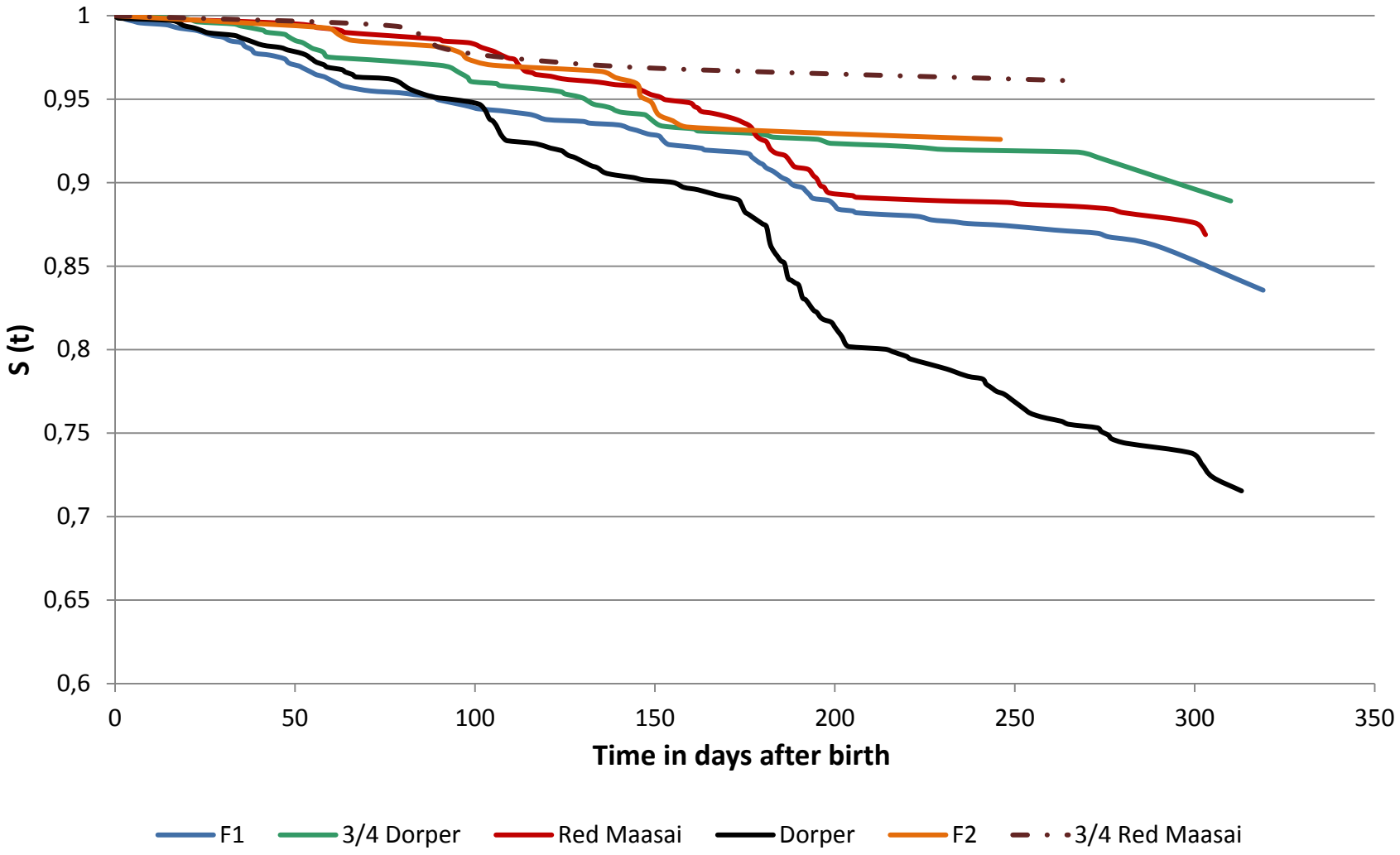
- 3935 records on animals born from January 2001 to December 2012
- Traits of interest:
  - Survival to 320 days (all animals)
  - Survival to first lambing (female animals: N=1957)
- Data analyzed using the survival kit version 6.1 (Ducrocq et al 2010)
- Proportion of animals that survived to 320 days: **87**%
- Proportion of female animals that survived to first lambing: **72.4**%

Reasons for culling animals

Disposal Category	Disposal reasons recorded
1. Sold	Culled, Sold
2. Predation	Predation, Snake poison
3. Pneumonia	Pneumonia, Lung abscess
4. Other Disease	Pulpy Kidney, Oculo myiasis, Vesicular stomatitis, Anaplasmosis, Helminths
5. Dam-Weak	General weakness, Malnutrition
6. Unknown	Accident, Unknown
7. Experiment	Experiment

RESULTS

Kaplan Meier survivor curves to 320 days for various breeds



Summary statistics for fixed effects affecting survival to 320 days

Fixed Effect	P-Value	Number of records	Percent culled	Relative risk
Sex: Male	***	1942	17.6	**1.00**
Female		1993	8.5	0.40

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Fixed Effect	P-Value	Number of records	Percent culled	Relative risk
Sex: Male	***	1942	17.6	1.00
Female		1993	8.5	0.40
Breed: Dorper	***	681	25.6	1.00
Red Maasai		993	11.8	0.65
F1		932	13.2	0.90
¾ Dorper		811	8.5	1.07
¾ Red Maasai		159	3.8	0.27
F2		270	7.4	0.78
F3		89	1.1	0.68

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Reason for Culling:	***			
Sold		1531	63	1.00
Predation		239	9.8	3.55
Pneumonia		78	3.2	1.92
Other Disease		163	6.7	8.41
Dam Weak		133	5.5	18.52
Unknown		43	1.8	11.07
Experiment		244	10	5.05

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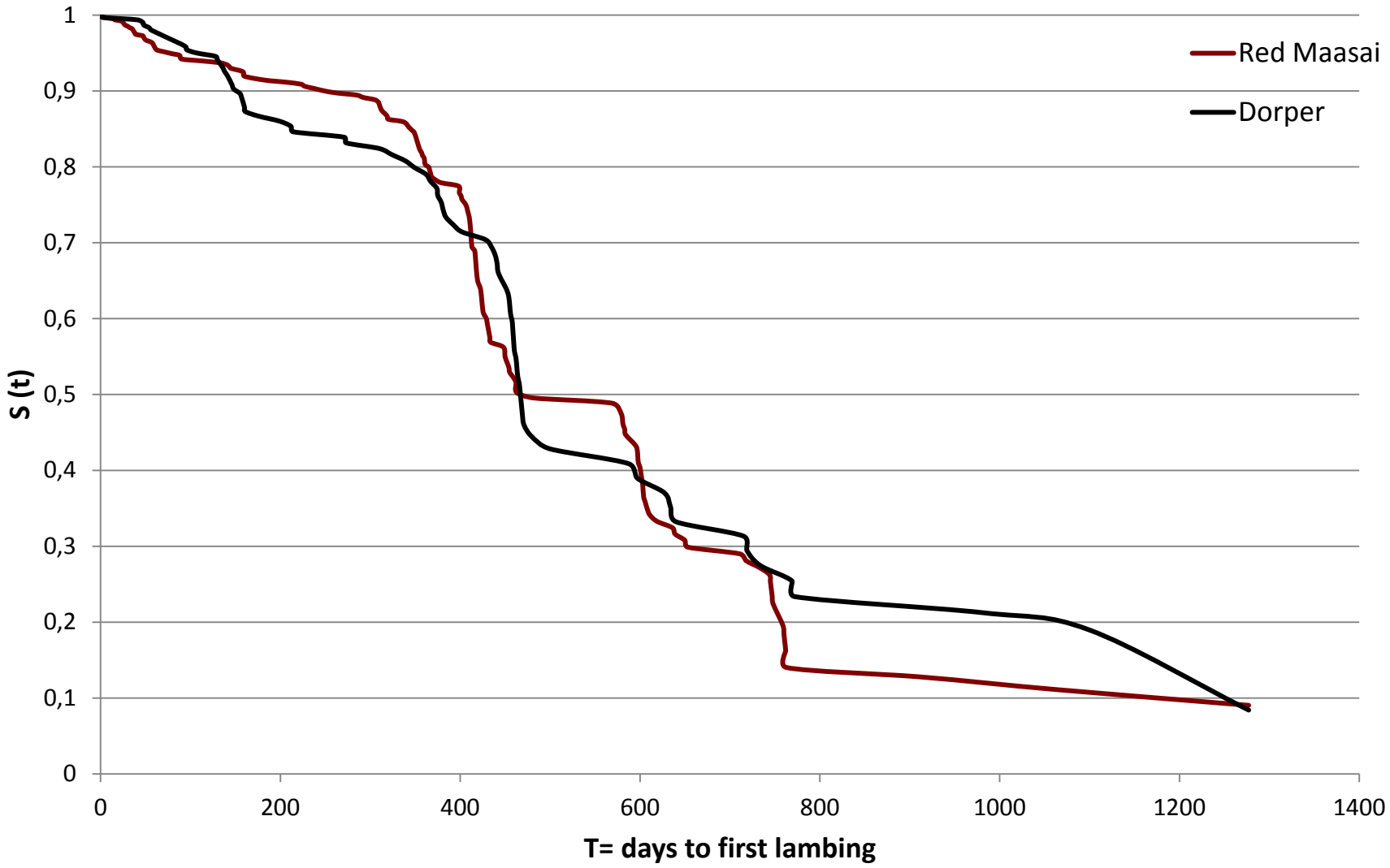
Type of Birth: Single	**	3728	12.4	1.00
Twin		207	23.7	1.08
Age of Dam	**			
Birth Weight	**			

Baseline curves for survival to first lambing for females of different breeds



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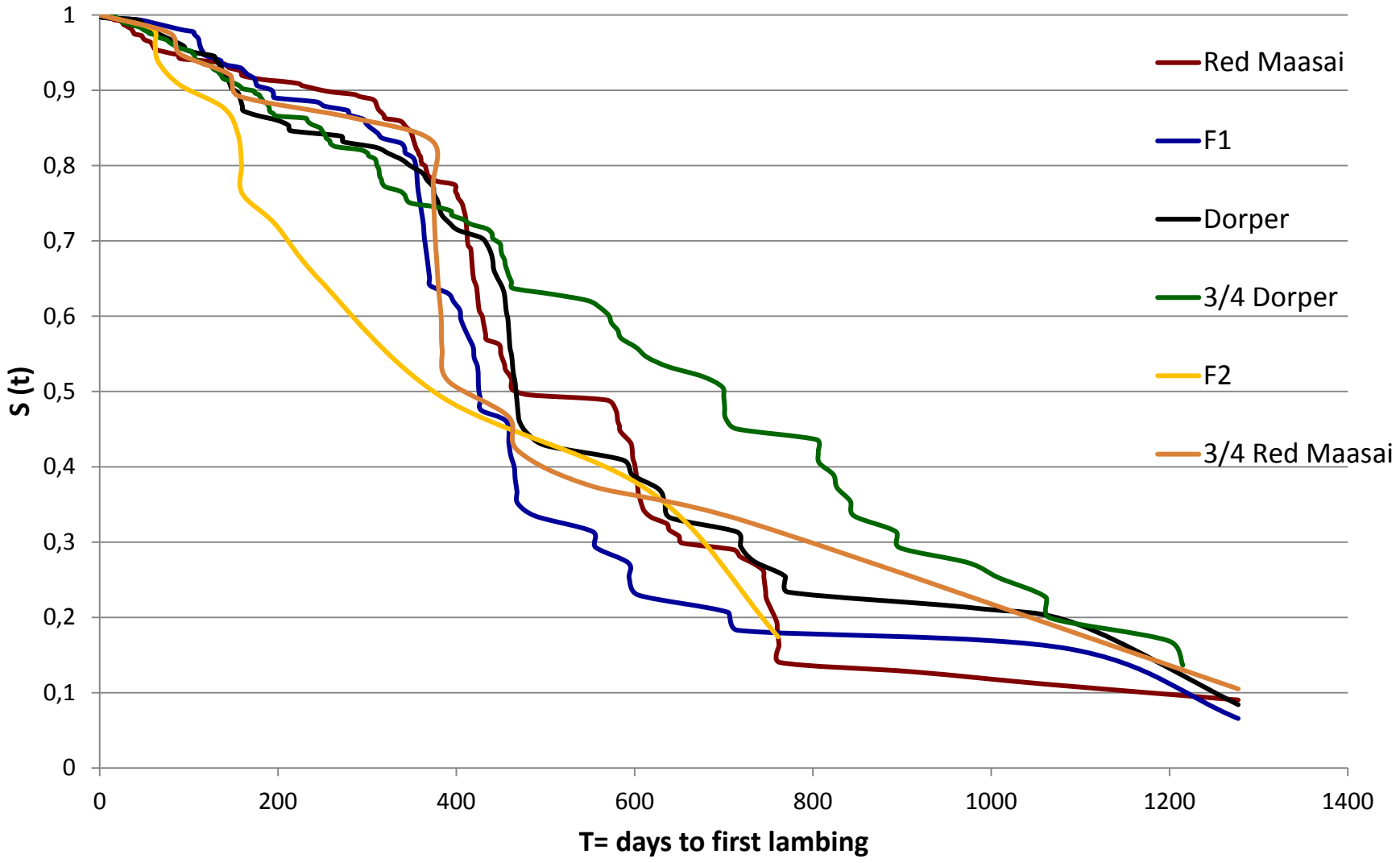

Summary statistics for fixed effects affecting survival to first lambing

Fixed Effect	P-Value	Number of records	Percentage culled	Relative risk
Breed	***			
Dorper		358	37.7	1.00
Red Maasai		490	19.6	**1.38**
F1		488	36.3	1.10
¾ Dorper		384	24	1.09
¾ Red Maasai		52	50	1.11
F2		141	10.6	1.79
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F3		44	0.2	19.4
Reason for Culling	***			
Sold		255	47.1	1.00
Predation		93	17.2	1.10
Pneumonia		15	2.77	2.76
Other Disease		57	10.54	2.53
Dam Weak		56	10.35	**4.10**
Unknown		65	12.01	3.48

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Unknown		65	12.01	3.48
Year-Season of Birth (20 levels)	***			
Type of Birth	ns			
Single		1863	27.2	1.000
Twin		94	37.2	0.767

Concluding Remarks

- Pure-bred Red Maasai animals survived better than Dorpers up to 320 days
- Various levels of Red Maasai x Dorper animals survive well until 320 days, however, female animals that did not lamb within 400 days were more rapidly culled
- Twinning was not common in the population
- Aside from being sold, the greatest cause of loss of animals was predation

Acknowledgement

- ILRI Kapiti ranch
- Pastoral communities
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Thank you

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