Open sessions of the Standing Technical and Research Committees

Epidemiological patterns and risk factors for foot-and-mouth disease exposure in traditional livestock-keeping systems of northern Tanzania

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CIDLID FMD PROJECT IN TANZANIA

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Tanzania Wildlife Research Institute

The Pirbright Institute

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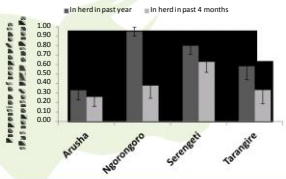
Conclusions and recommendations

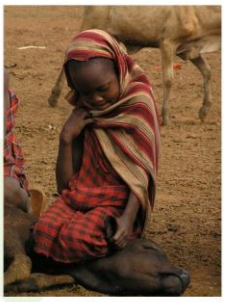
- **FMD is very prevalent in traditional livestock-keeping systems across northern Tanzania, but infection patterns vary widely across ecosystems**
- **Non-wildlife (anthropogenic and livestock) related factors appear to be important**
  - Additional predictors (livestock management/movement) need evaluating
  - In some areas close interactions, hence transmission, amongst livestock and buffalo populations may occur
  - Risk factors for seropositivity should be further explored through serotype-specific analyses
- Need to characterise the **diversity of viruses** to understand transmission patterns amongst livestock and buffalo
- Urgent need to investigate **options for disease control** that address the needs of livestock-keepers while protecting the ecological integrity of wildlife-protected areas

Great concern for livestock-keeping communities in traditional systems

- Livestock-keepers in much of Africa consider FMD as one of the most important diseases of livestock (loss of milk, calf mortality, reduced income from sale, etc.)
- In rural Tanzania, FMD ranked second amongst the most important livestock diseases with multiple outbreaks each year (80 - 90% in the past year, up to 63% in the past four months)



Endemic FMD in Africa
Key areas of research



Relative importance of livestock- and wildlife-related factors in maintenance and transmission?

The role of wildlife

How much cattle infection is associated with spill-over from wildlife?

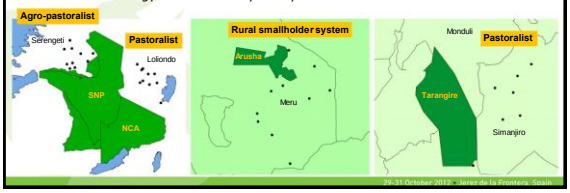
How can we best control FMD adjacent to wildlife protected areas?

?

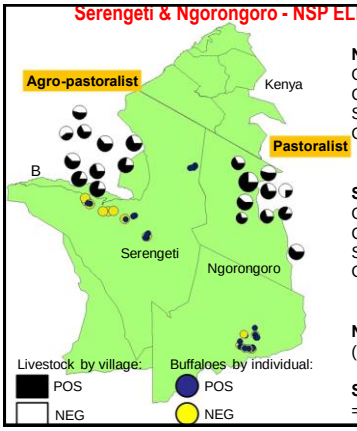
Sian Brown

Cross-sectional surveys in northern Tanzania

- Four ecosystems
- Livestock surveys:
  - A range of production systems
  - Ten villages per ecosystem, two households per village
  - Serological surveys involving 30 - 40 livestock (cattle, sheep, goats) in each households and questionnaire conducted
- Buffalo surveys: 25 animals per ecosystem from a range of herds
- NSP ELISA serology and data analysed by GLMM



Serengeti & Ngorongoro - NSP ELISA seroprevalence



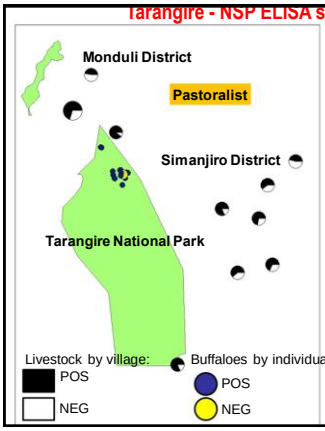
Ngorongoro livestock:
Overall - 64% (n = 709)
Cattle - 76% (n = 359)
Sheep - 51% (n = 126)
Goats - 54% (n = 224)

Serengeti livestock:
Overall - 67% (n = 725)
Cattle - 77% (n = 408)
Sheep - 46% (n = 90)
Goats - 59% (n = 225)

Ngorongoro buffalo - 90% (n = 140)

Serengeti buffalo - 69% (n = 26)

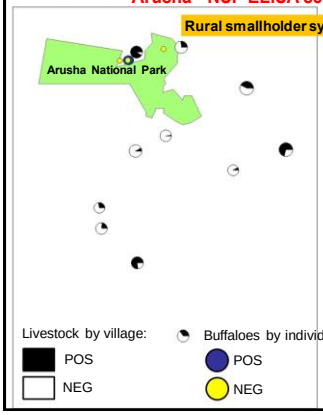
Tarangire - NSP ELISA seroprevalence



Seroprevalence:
Overall - 66% (n = 449)
Cattle - 76% (n = 225)
Sheep - 45% (n = 73)
Goats - 60% (n = 149)

Buffaloes - 96% (n = 24)

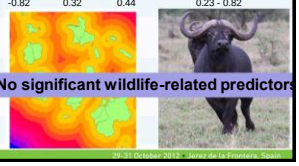
Arusha - NSP ELISA seroprevalence



Seroprevalence:
Overall - 34% (n = 615)
Cattle - 38% (n = 296)
Sheep - 36% (n = 105)
Goats - 26% (n = 213)

Buffaloes - 48% (n = 23)

Predictors of seropositivity		p-value	Estimate	Std error	Odds ratio	Odds ratio (95% CIs)
Age in years		Control	0.30 (per year)	0.026	1.35 (per year)	1.28 - 1.42
Management system		$p < 10^{-3}$				
	Agro-pastoralist		0.66	0.25	1.93	1.18 - 3.15
	Pastoralist		0.28	0.20	1.32	0.89 - 1.95
	Rural smallholder		-1.3	0.30	0.27	0.15 - 0.49
Species		$p < 10^{-15}$				
	Bovine		0.54	0.30	1.71	0.95 - 3.08
	Caprine		-0.46	0.31	0.63	0.34 - 1.16
	Ovine		-0.82	0.32	0.44	0.23 - 0.82
Distance walked for grazing/watering (wet and dry season)		NS				
Distance to protected-area boundaries		NS				
Frequency of interaction with buffalo		NS				
Frequency of interaction with other susceptible wildlife		NS				



No significant wildlife-related predictors

Conclusions and recommendations

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Thanks!

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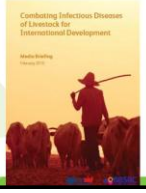

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Field team

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