



Characteristics of the Swedish cattle movement network 2005 - 2022

CONCLUSIONS

- 🐄 Increase in reported movements, not necessarily increased risk of disease spread
- 🐄 Structural changes in the sector may partly explain changes in the network
- 🐄 Drought in 2018 may have led to fewer movements and a decrease in the cattle population

BACKGROUND & AIM

Movements of livestock between holdings is important for the spread of infectious diseases

Aim: Analysis of all reported Swedish cattle events 2005 - 2022, to help prevent disease spread

COX PROPORTIONAL HAZARDS MODEL

Outcome: Time-to-movement

Covariates:

- birth year
- ingoing & outgoing animals
- indegree & outdegree
- sex[◇]
- proportion of females[◇]
- herd size[◇]

[◇] Interaction effects shown in **Fig. 2**

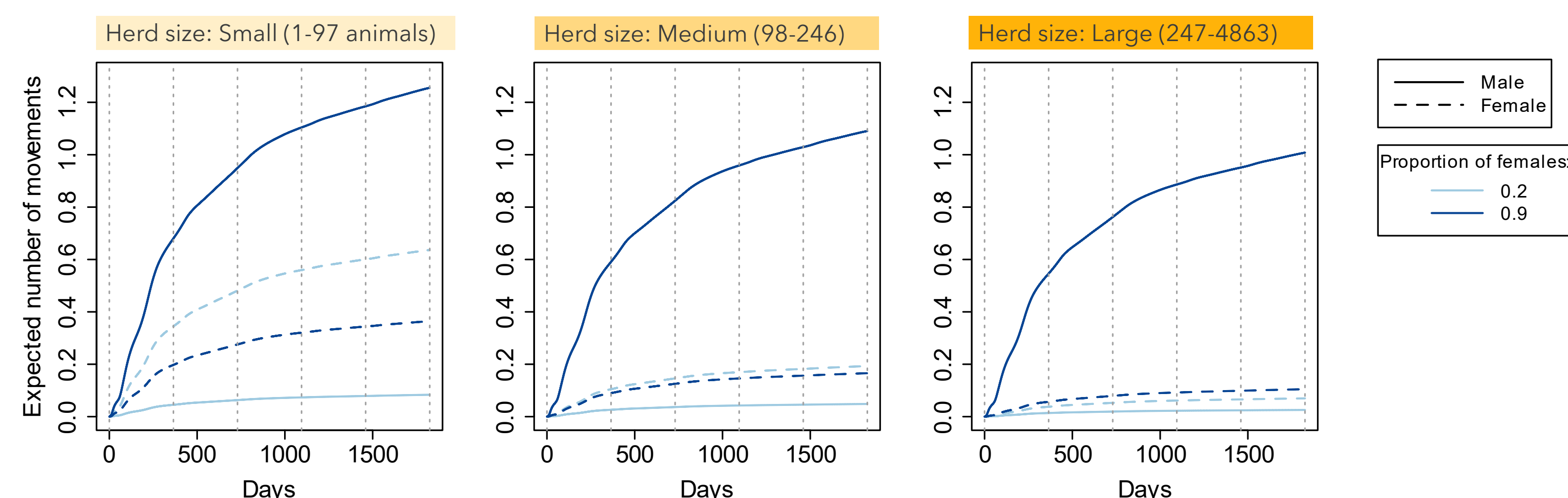


Fig. 2 Expected number of movements for Swedish cattle per age in days, derived from a multivariable Cox proportional hazards model. The covariate birth year is set to be 2022, and in- and outgoing animals as well as in- and outdegree are set at the lowest categories. The dotted vertical lines divide the age by year.

RESULTS

- Increase in reported movements
- Decrease in no. of cattle and holdings
- Increase in average herd size

NETWORK METRICS

More common now with a yearly indegree or outdegree of 1, less common with 0 or > 1

Fig. 1

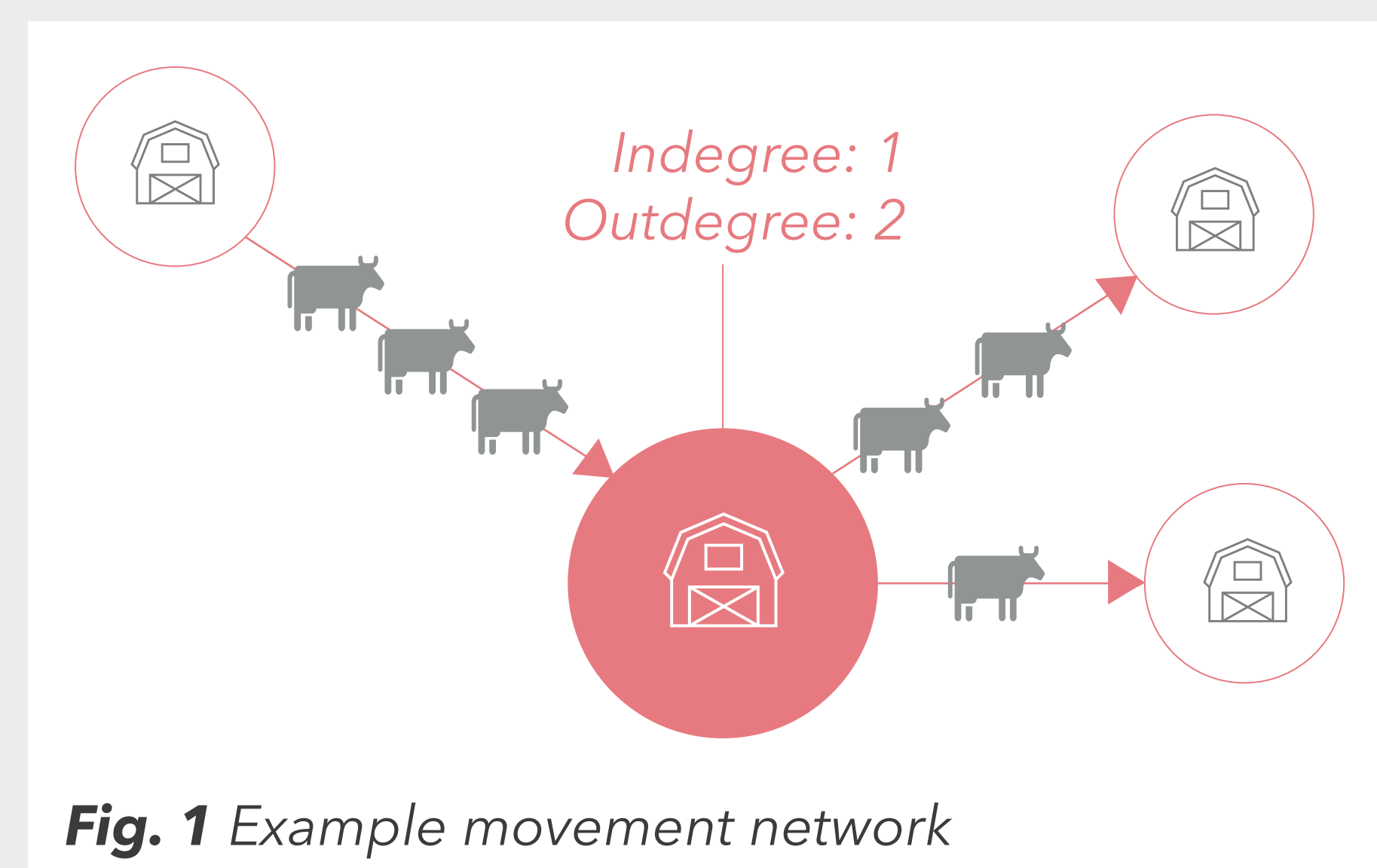


Fig. 1 Example movement network

LOCATION CHANGE PATTERNS (LCP)

	Birth year	
	2005	2017
Male	276 k	251 k
1 → 2	54 %	55 %
1	41 %	35 %
1 → 2 → 3	3 %	5 %
Female	264 k	243 k
1	71 %	65 %
1 → 2	19 %	17 %
1 → 2 → 1	5 %	9 %

Construction of LCP:

For each individual, enumerate each visited holding in order of visit

LCP of home-comers*

significantly more common in 2022 vs. 2005

*e.g.
 1 → 2 → 1
 1 → 2 → 1 → 2
 1 → 2 → 1 → 3
 1 → 2 → 1 → 3 → 1

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bit.ly/MycoModel

