

Deforestation alters spillover risk of multi-host pathogens

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INTRODUCTION

- Many pathogens can infect multiple host species and understanding the conditions under which these pathogens can spill over to humans is of increasing importance.
- Land use change, such as deforestation, can bring together novel assemblages of wildlife hosts, domestic animals and people, leading to increased zoonotic spillover potential.
- Models that integrate land-use change effects on transmission of multihost pathogens are urgently needed.



QUESTIONS

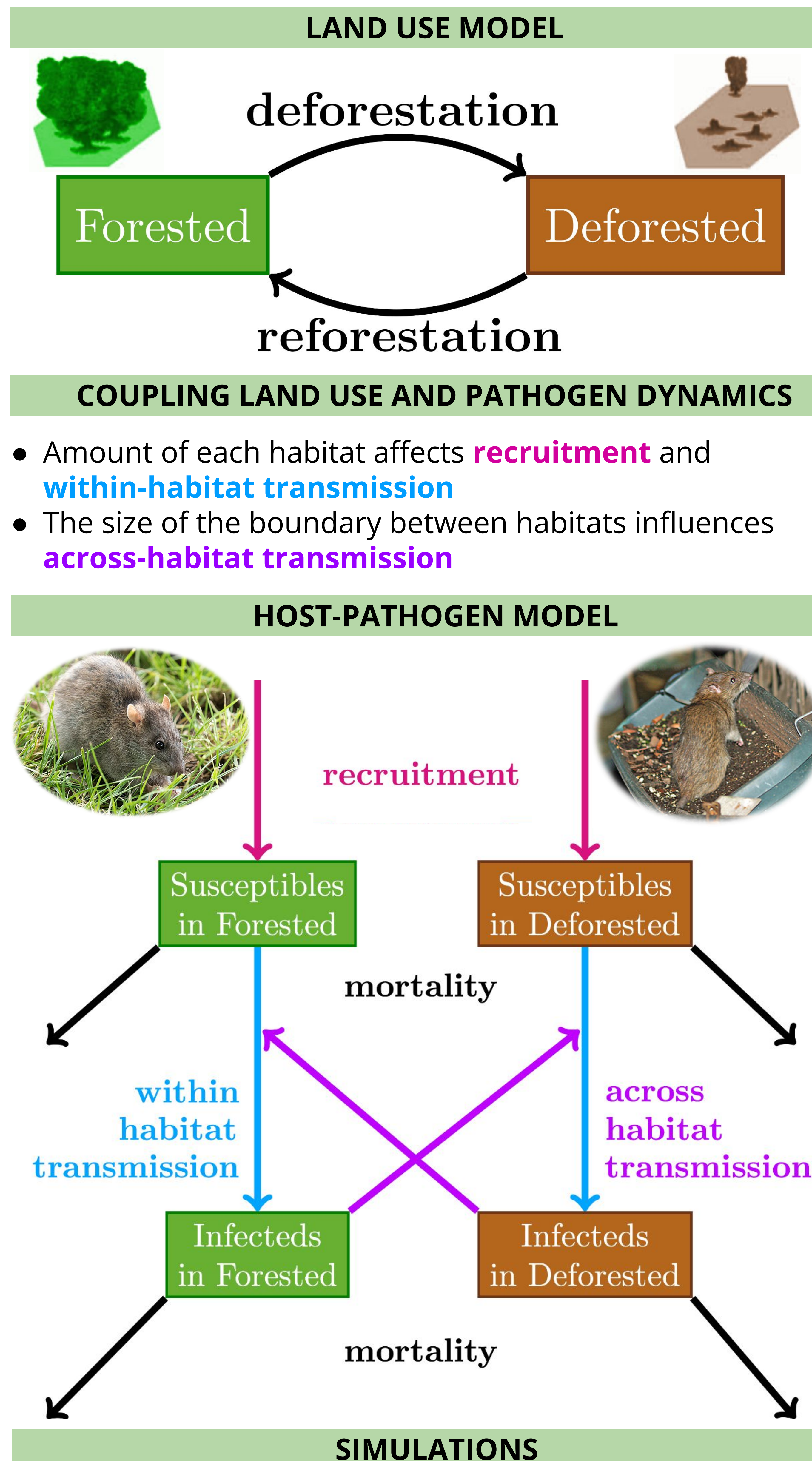
- How does slow versus fast deforestation influence infection dynamics through time?
- How does the relative abundance of hosts alter transmission across habitats?
- How does deforestation rate affect peak infection and cumulative infection of hosts in human-altered habitats?

APPROACH

- We used differential equations to couple land use change to infection dynamics in forest-dwelling hosts and hosts in deforested habitats, with transmission between hosts occurring at the habitat boundaries.

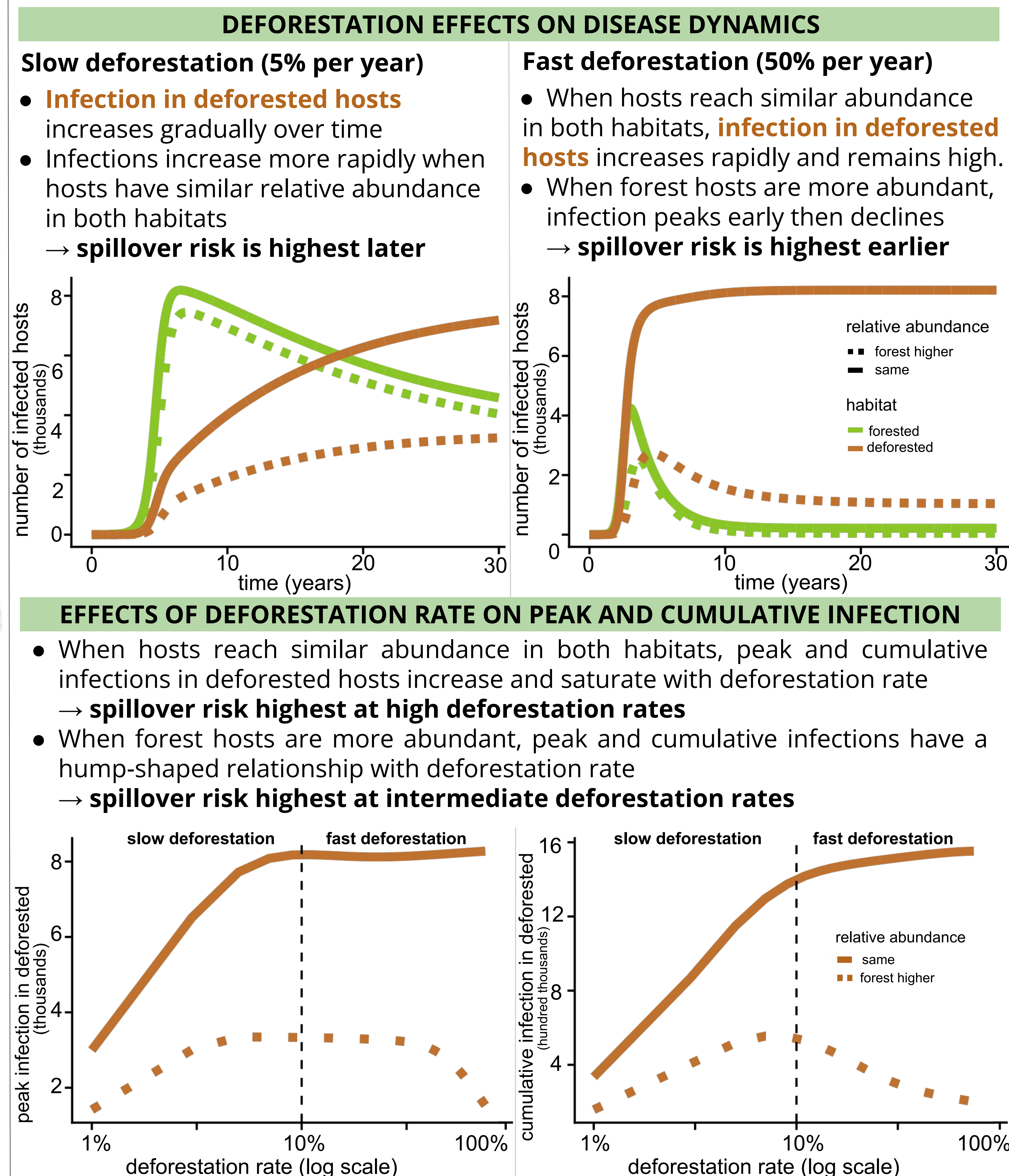
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METHODS



- We covaried the deforestation rate and host relative abundance in deforested habitat and recorded:
 - infection trajectories in each habitat type under slow and fast deforestation
 - peak and cumulative infection in deforested habitat (**proxies for short- and long-term spillover risk**)

RESULTS



DISCUSSION & FUTURE DIRECTIONS

- Deforestation rates and the relative abundance of deforested hosts influence transient and long-term zoonotic exposure risk
- Surveillance and the prevention of inter-species mixing at habitat boundaries could help mitigate disease spillover to humans
- Future work will explore effects of reforestation, transmission mode (e.g. vector-borne), and host competence for infection on spillover risk