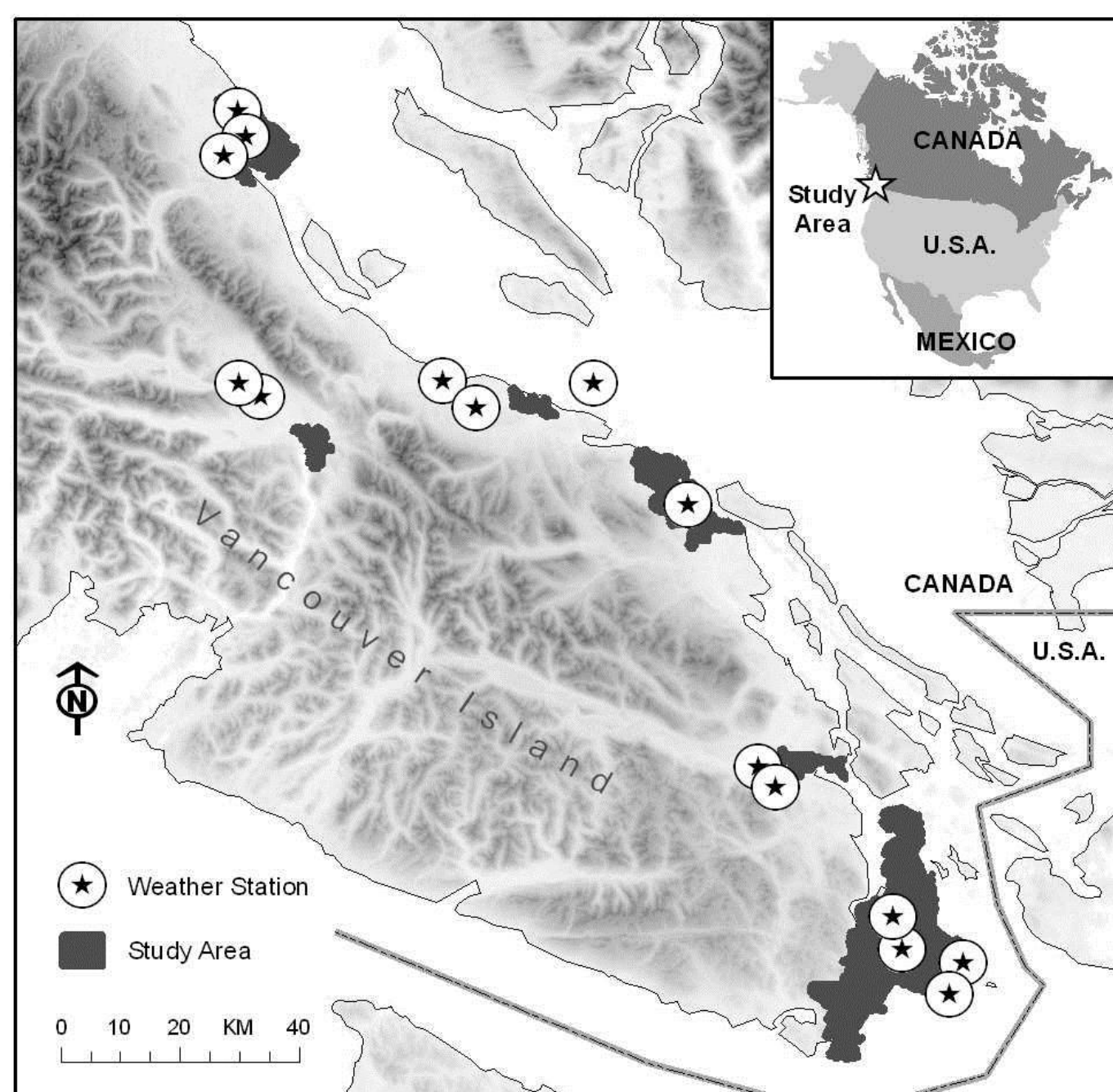


Climatic Influences on Air, Soil, and Tree *Cryptococcus gattii* Populations in Vancouver Island, Canada

Background

Vancouver Island, Canada reports the world's highest rate of human *Cryptococcus gattii* (*C. gattii*) cases. Humans incidentally inhale propagules and the fungus causes ~25 illnesses and 4 deaths per year. The *goal of this study* was to determine the relative importance of biophysical conditions for monthly *C. gattii* dynamics from the air, trees, and soil. The results provide insight into periods with elevated risk of contracting the disease. This information is difficult to identify from existing surveillance systems.



Data & Methods

We evaluate two existing *C. gattii* air, tree, and soil records:

- 1) Longitudinally sampled (4+ times) plots over 2003-2004.
- 2) Newly sampled plots from areas with *C. gattii* activity over 2002-2004.

We related weather conditions against *C. gattii* concentrations (soil, air) or *C. gattii* presence/absence (tree)

- temperature
- precipitation
- specific humidity
- shortwave solar radiation
- wind speed

We tested weather conditions over the previous and current day, previous week, and previous month (past 30 days). Hierarchical Generalized Linear and Mixed Effect Models control for repeated measurements, clustered sampling, and seasonality.

Results

Longitudinally sampled plots

Soil

- Warmer T° → *C. gattii* ↓
- Higher Wind Speed → *C. gattii* ↓

Tree

- Unrelated to weather, however temporally autocorrelated

Air

- Greater Solar Radiation → *C. gattii* ↑
- Wind speed, moderate → *C. gattii* ↑
- Wind speed, strong → *C. gattii* ↓

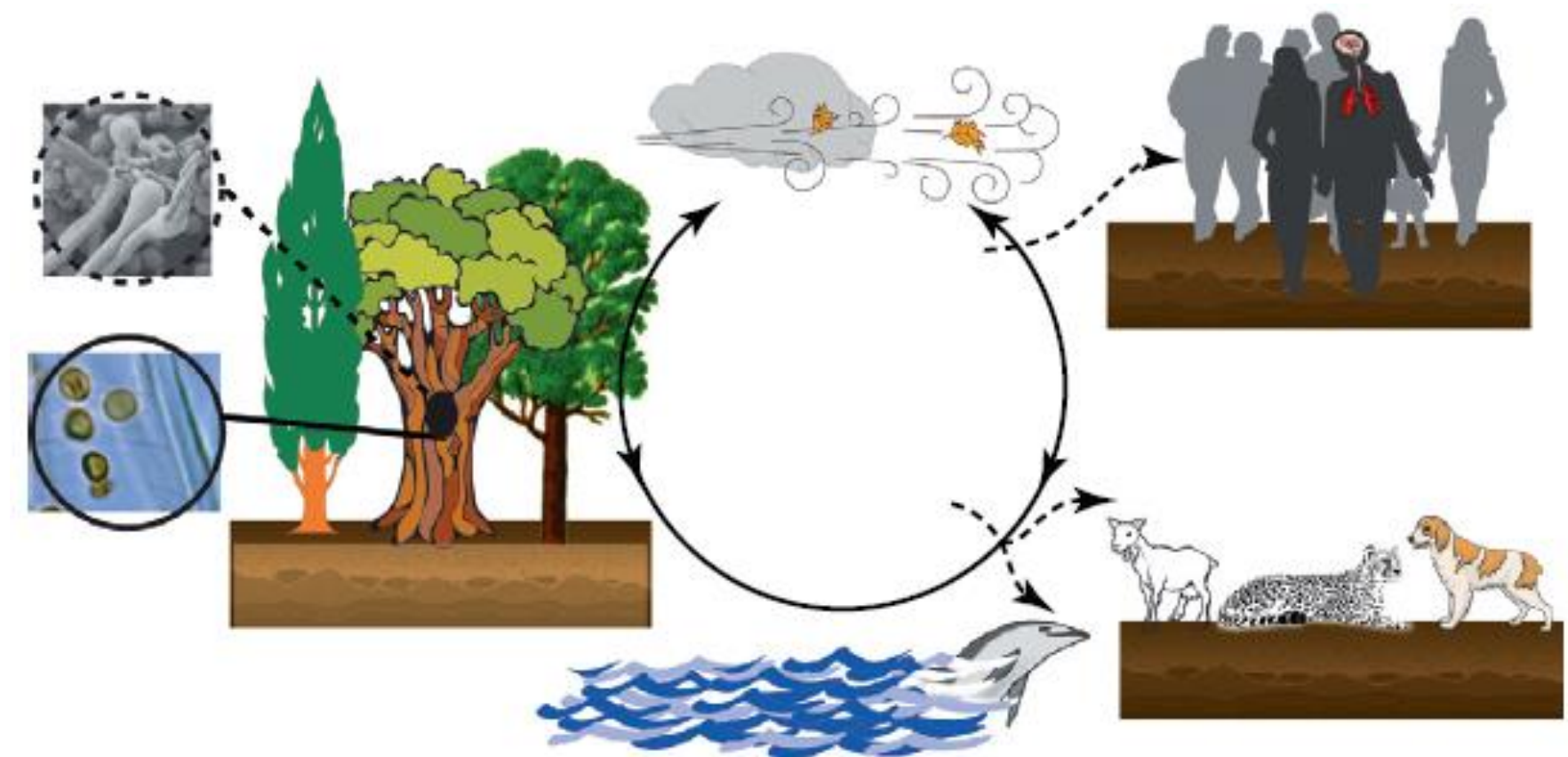
Newly sampled plots

Soil

- Warmer T° → *C. gattii* ↓
- Summer, Fall → *C. gattii* ↑
- Temporally autocorrelated

Tree

- Warmer T° → *C. gattii* ↓
- Greater Solar Radiation → *C. gattii* ↑
- Higher Wind Speed → *C. gattii* ↑



Chaturvedi & Chaturvedi (2011)

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Discussion

Geographic areas and periods of time with elevated temperatures decreased *C. gattii* tree isolations and soil concentrations. Collectively, our results provide insight into *C. gattii*'s life cycle. Both trees and the surrounding soil appear to act as *C. gattii* reservoirs. Wind may be a key process transferring *C. gattii* from the soil, into the air, and onto trees in the wider study area. The highest airborne *C. gattii* risk is from August-October on sunny days with moderately windy conditions. The greatest risk of contracting *C. gattii* from the soil is on relatively cool June and July summer days.

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