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Evolutionary dynamics of eco-physiological traits in bark beetle-host interactions

Bark beetles have devastated vast areas of western North American pine forest, including around 15 million hectares in British Columbia alone. A remarkably intricate suite of ecological interactions between conspecifics and their host trees characterizes the ecology of bark beetles. A key component in understanding outbreak dynamics of bark beetles is to elucidate the role eco-physiological interactions play in the ecological and evolutionary dynamics of the beetle-host populations.

By meshing a series of well-characterized existing models describing different aspects of the bark beetle-host ecology I will present a qualitative process-based composite model describing the eco-physiological intra- and inter-specific beetle-host interactions. By defining a quantitative genetic basis for traits describing the intra- and inter-specific ecological and physiological interactions the ecological model is then extended to an evolutionary model. Finally, the evolutionary dynamics of different suite of traits is explored and the feedback to ecological dynamics is discussed.