Hotspots in high-latitude moss-associated N_2 fixation

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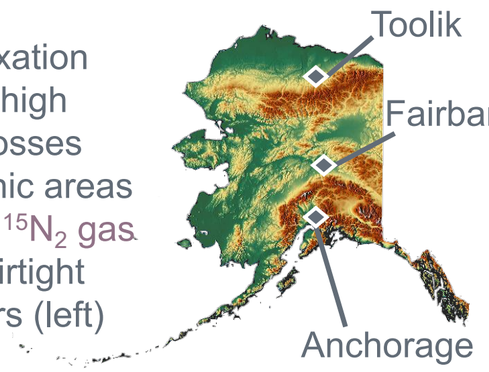
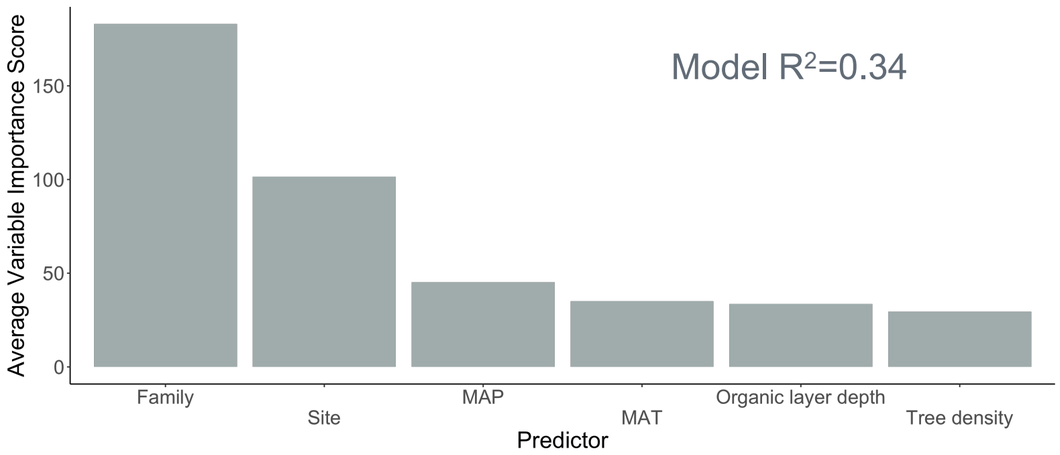
Moss-associated N_2 fixation is the largest source of new N to nutrient-limited high-latitude ecosystems. Identifying where and why hotspots occur can improve modeling and understanding of process rate variation.

We measured N_2 fixation associated with a high diversity of host mosses across three geographic areas of Alaska (right) using $^{15}N_2$ gas incubations in an airtight syringe over 24 hours (left)



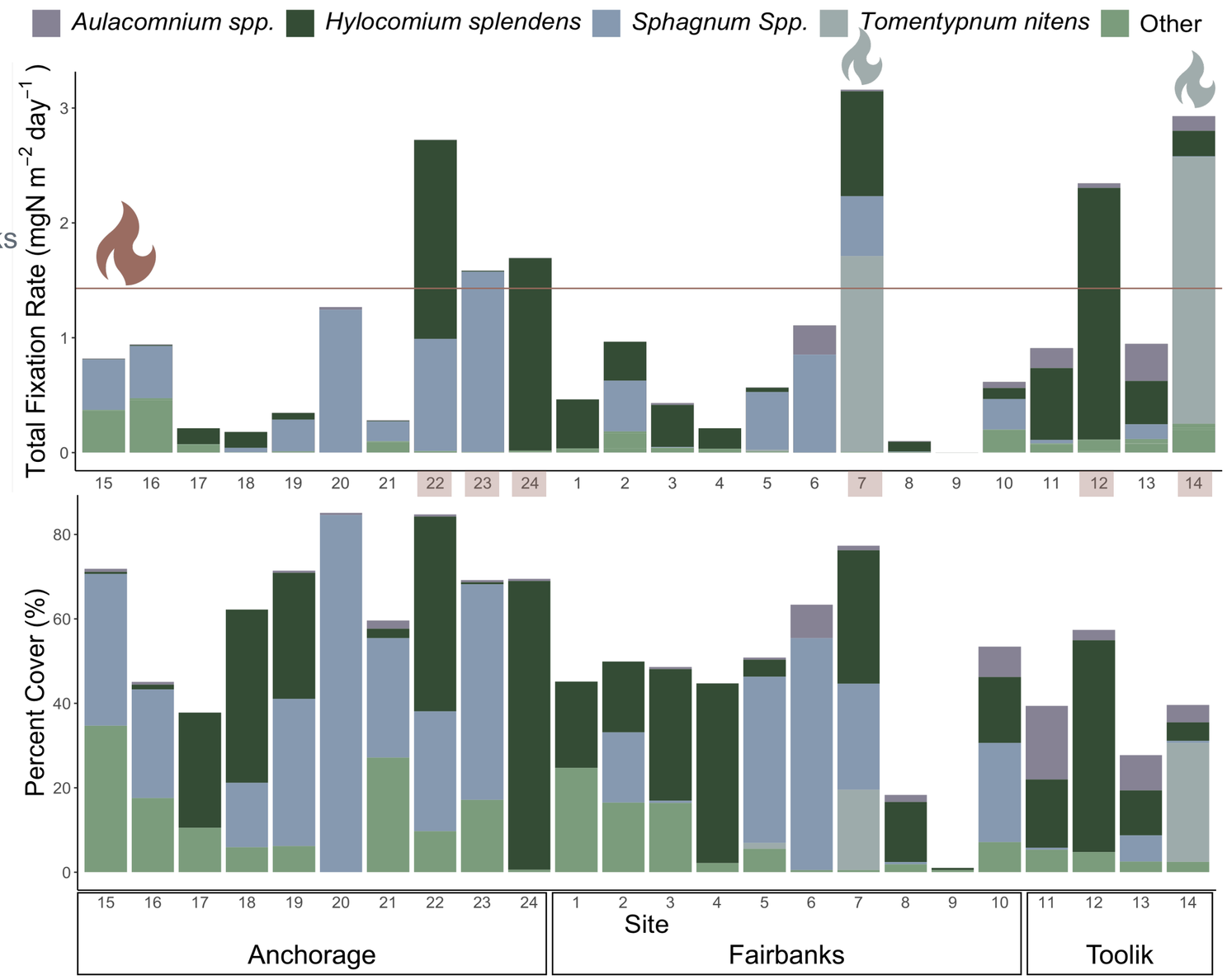
1. Host moss identity was the most important predictor of associated N_2 fixation rates, but environmental and climatic factors also played an important role



-Above: Random forest results with N_2 fixation rate (μg N g dry moss^{-1} day^{-1}) as the response variable from all sites

-Mixed models with host moss genus as a fixed effect and site as a random effect showed significant differences among genera and consistent trends between genera across Alaska

2. Multiple hotspots were observed across Alaska, which are potentially linked to moss identity and abiotic drivers



-Hotspots=total N_2 fixation rate > median rate + 3 standard errors (SE)

-Hotspots denoted by bars in top panel that cross red line (highlighted in red, intense hotspots > median+10 SE with blue flame)

-Non-significant but positive relationships were observed for total N_2 fixation and pH, gravimetric moss water content

-Both intense hot spots contained high-N_2 fixing *T.nitens*