Sapling mortality, hotter drought, and pine forest outlook in Megamexico 3

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View NE from Sierra La Madera in northern Sonora

Typical Sky Islands of NE Sonora and S Arizona

Weldon Heald (1967)
View east from Sierra Libre in central Sonora towards the Sierra Madre Occidental

Three new plant communities
Coastal thornscrub – succulents
Foothills thornscrub - legumes
Tropical Dry Forest
Los Ajos

32°N

Mazatán

28°N

Manatlán

20°N
Almost half of the world’s pine trees are found in Mexico.
Tropical and subtropical mountains of Mexico have the largest
diversity of pine trees in the world (49 species of c. 110). California
is second. The same applies to oaks (160/425). The Madrean Sky
Islands are in between these two areas.
Forest persistence may be at greatest risk along steep elevation gradients, where seedling and sapling mortality due to predicted hotter drought could drive longer-term species range contractions.
For regeneration, *Pinus* forests rely on the ability of early life stages to tolerate hotter drought … Model projections assessing impacts of hotter drought supported by drought by temperature experiments are lacking.

Of particular concern are regions that are composed of steep elevational gradients associated with “sky islands”
1) We tested the sensitivity to experimental hotter drought of saplings of five Mexican pine species from most of Megamexico latitudes:

- *P. engelmannii*
- *P. greggii*
- *P. montezumae*
- *P. pseudostrobus*
- *P. strobiformis*

- Base temperature cycle of summer in the Sierra Madre Occidental
- Base temperature +4°C