Project Update: October 2020

So far, we have done two exploratory expeditions to the collection sites, one in the Sierra de la Marta in Coahuila, and another in the Cerro del Potosí in Galeana, Nuevo León. Samples were collected from *Pinus culminicola* and *Pinus hartwegii* in both sites to do DNA extraction trials and quantification. We observed in the first location an increase of secondary vegetation, especially a notorious number of individuals of *Populus tremuliodes*, a common indicator of ecological disturbance, mostly concentrated in the 3,200-3,400 m asl range, but was found even at 3,650 m asl, which confirms it 's upwards migration within *P. culminicola* and *P. hartwegii* distributional range. On our second expedition we were able to observe post-fire areas with no natural regeneration of seedlings, as well as the first sightings of *P. termuloides* at approximately 3,300 m asl. DNA extractions have proven successful with an average of 950 ng./ul. of DNA per sample.

Ecological variables (Cuervo-Robayo, et al., 20014) have been analysed using the software QGIS and R studio to find which variables were of most statistical significance for both species distribution. We have found on these analyses temperature seasonality and annual precipitation as most important, and based on those outcomes we have sent to synthesize three sets of primers for the genes dhn1, aqua-MIP, and Glu for testing (Zhou, et al., 2014).





Figure 1. Sierra de la Marta (visible abundance of P. tremuloides) on the right and Cerro del Potosí on the left.



Figure 2. Sample and data collection at 3,700 masl.



Figure 3. a) Post-fire areas in the Cerro del Potosí (last fire occurred in 1998); b) Highest altitudinal area from the Cerro del Potosí.



Figure 4. a) DNA extraction from leaf samples; b) Principal Components Analysis´ plots for the Cerro del Potosí.

*These photos are mine. I agree to post them on Rufford's website. GitHub repository: https://github.com/katialtc/landscapegenomics

References:

Cuervo-Robayo, A. P., Téllez-Valdés, O., Gómez-Albores, M. A., Venegas-Barrera, C. S., Manjarrez, J., & Martínez-Meyer, E. (2014). An update of high-resolution monthly climate surfaces for Mexico. *International Journal of Climatology*, *34*(7), 2427-2437.

Zhou, Y., Zhang, L., Liu, J., Wu, G., & Savolainen, O. (2014). Climatic adaptation and ecological divergence between two closely related pine species in Southeast China. Molecular Ecology, 23(14), 3504-3522.