

Stand level water-use in forests of contrasting rainfall regimes: assessing the impacts of future drying on native Hawaiian ecosystems



Dr. Yoshiyuki Miyazawa installing sap flux probe at a previous site; protocol from previous work informed the sampling design for this project.

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Public Summary

We examined how two of Hawai‘i’s most important native trees, ō‘hi‘a and koa, use water. The field research was conducted in the Hawai‘i Experimental Tropical Forest (HETF), at a montane rainforest and a montane mesic forest site. Our project monitored the seasonality and daily trends in sapflux, which represents a component of transpiration. The mesic forest site had more daily variation in sapflux, but lower overall sapflux rates, indicating that these trees used less water. From these estimates we are in the process of scaling up to estimate water use for each of these forests, using several years of plot census data on tree size and growth. These are key baseline data that will help quantify how Hawai‘i’s dominant native trees take up and transpire water, providing natural resource managers with information about the true economic and biological values of maintaining native vegetation. By comparing tree use at two sites varying in rainfall, we predict how climate change (drier conditions are predicted) will affect the hydrological functioning of Hawai‘i’s watersheds. Understanding the variability in water use within a species and across environments is a key to providing justification for the value of native forests as providing key ecosystem services.



Sap flux probes will be established in canopy trees near the tower areas at both Pu'u Wa'a Wa'a (left) and Laupāhoehoe (right).