Background

Before Santa Rosa Island was heavily grazed, it was thought to have had large stands of island oak trees, *Quercus tomentella*, that provided a critical source of water for the ecosystem by creating a “cloud forest”. Wind-borne fog collects on the leaves, branches, and twigs of the island oaks and other native shrubs. Once the water condenses it drips, falls, and soaks into the soil. Introducing cattle and sheep has damaged the ecosystem and nearly decimated the island’s native oaks and woodland plants. The Cloud Forest Restoration project aims to restore native trees and plants on Soledad Ridge. Fog panels covered in mesh have been installed in areas on the ridge to collect fog and drip water down into the soil, mimicking the ability of native shrubs and trees.

Methods

1. After selecting 2 m long testing sites in Ecological Networks 1 and 4, lay a transect tape down along the area of testing.
2. Use Pretty Random app generator to select 5 random points along the transect tape.
3. Position the soil moisture probe 5 cm downslope when testing at fog panels. In wattle only sites, position the soil moisture probe 5 cm upslope of the wattle.
4. Insert the probe 5 cm deep into the ground, wait 1 minute, then record soil moisture reading on data sheet.
5. Insert the probe 5 cm further into the ground (total of 10 cm), wait 1 minute, then record soil moisture reading on data sheet.
6. Repeat for 4 testing areas and repeat steps for multiple days.

Results

1. Fog fences make the soil wetter than wattle only, both at 5 (4.08 vs 1.33) and 10 (5.99 vs 1.55) cm depths
2. The p-value for t-test of 5 and 10 cm fog fences is $3.24263 \times 10^{-3}$
3. Soil moisture seems the same at both depths for wattles only (1.33 vs 1.55), but is moister at 10 cm than at 5 cm (5.99 vs 4.08, $p < 0.05$) for fog fences

Conclusion

Greater moisture at deeper depths for fog fences suggests that fog moisture input is not just superficial at the surface where it can evaporate away quickly, but that the moisture gets down to where it can keep the soil more consistently moist which is better for plant survival and growth. Native plants should be planted next to fog fences to receive more water. Long-term monitoring of plant survivorship at fog fences should be investigated to see the impact fog fences have on re-vegetating Soledad Ridge.