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Cultural Fire Behavior and Effects on Hazel Shrubs

Thomas Paulson

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Thomas Paulson, Jeffrey Kane, & Claire Brown

Forestry, Fire, and Rangeland Management, Cal Poly Humboldt, Arcata CA 95521

Introduction

Prescribed fire is a widely used land management technique that accomplishes many important cultural and ecological benefits to people and wildlife. Since 1935, wildfires have been suppressed and prescribed fires have been largely removed from the landscape. This has led to the loss of important cultural practices conducted by tribes in the Klamath Mountains. Prescribed fire is particularly useful for producing hazel plants that are optimal for basket weaving material used by the Karuk tribe. To produce California hazel (*Corylus cornuta*) with stems that are long and thin enough to produce baskets, an area must be burned often, approximately every three years with low intensity fire. The goal of this study is to develop an allometric equation to quantify the relationship between hazel height and basal diameter, as well as to determine the fuel, fire, and plant factors related to maximum temperature and lethal duration experienced by hazel shrubs.

Methods

- All burns were conducted by the Cultural Fire Management Counsel (CFMC).

Sample Location
Located in Martins Ferry California off highway 169 within the Klamath watershed. This land is currently owned and occupied by the Yurok tribe.

Data Sampling
- Two units were used (Pasko & Korb), with an approximate distance between them of a quarter mile.
- Six plots are within each unit, for a total of twelve plots.
- Each plot contains four hazel shrub, with the maximum distance between shrubs not exceeding ten meters.
- Variables collected include altitude, slope, litter and duff depths, canopy closure, residence time, maximum flame temperature, rate of spread, fine fuel consumption, duff consumption, scorch height, and the number of surviving stems.
- Multiple models for predicting fire behavior as well as an allometric equation for hazel were created in R.

Results

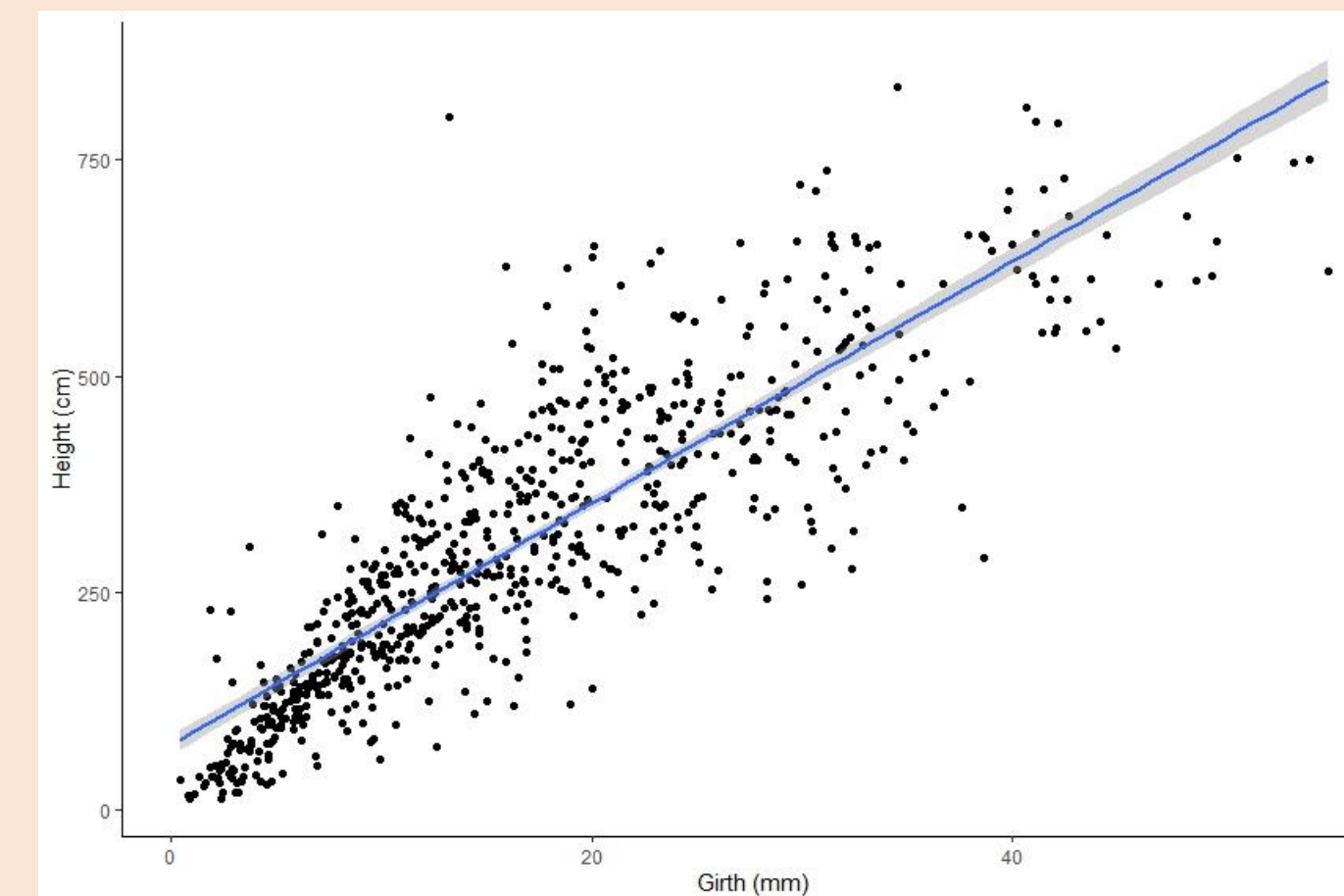- There was a strong relationship between hazel basal diameter and height metrics.

Figure 1: Girth (mm) vs height (cm) for hazel shrubs. There is a strong positive relationship (R^2: 0.747, p-value: $2.2 * 10^{-16}$) between the variables.

Discussion