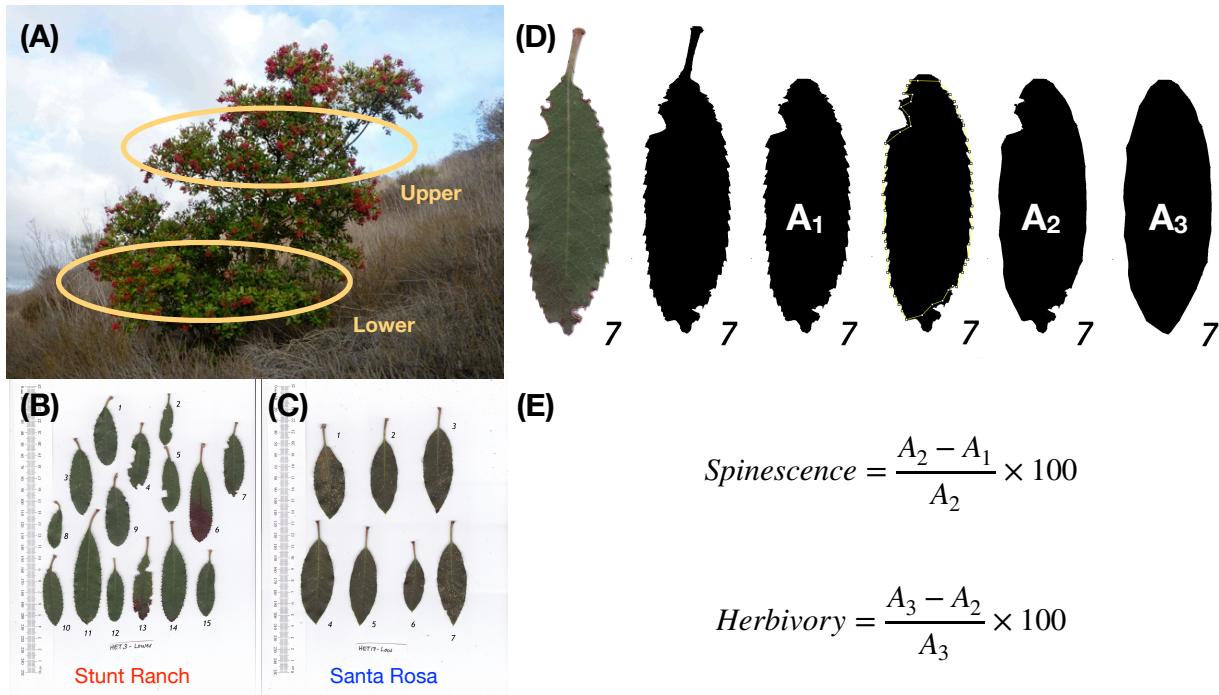
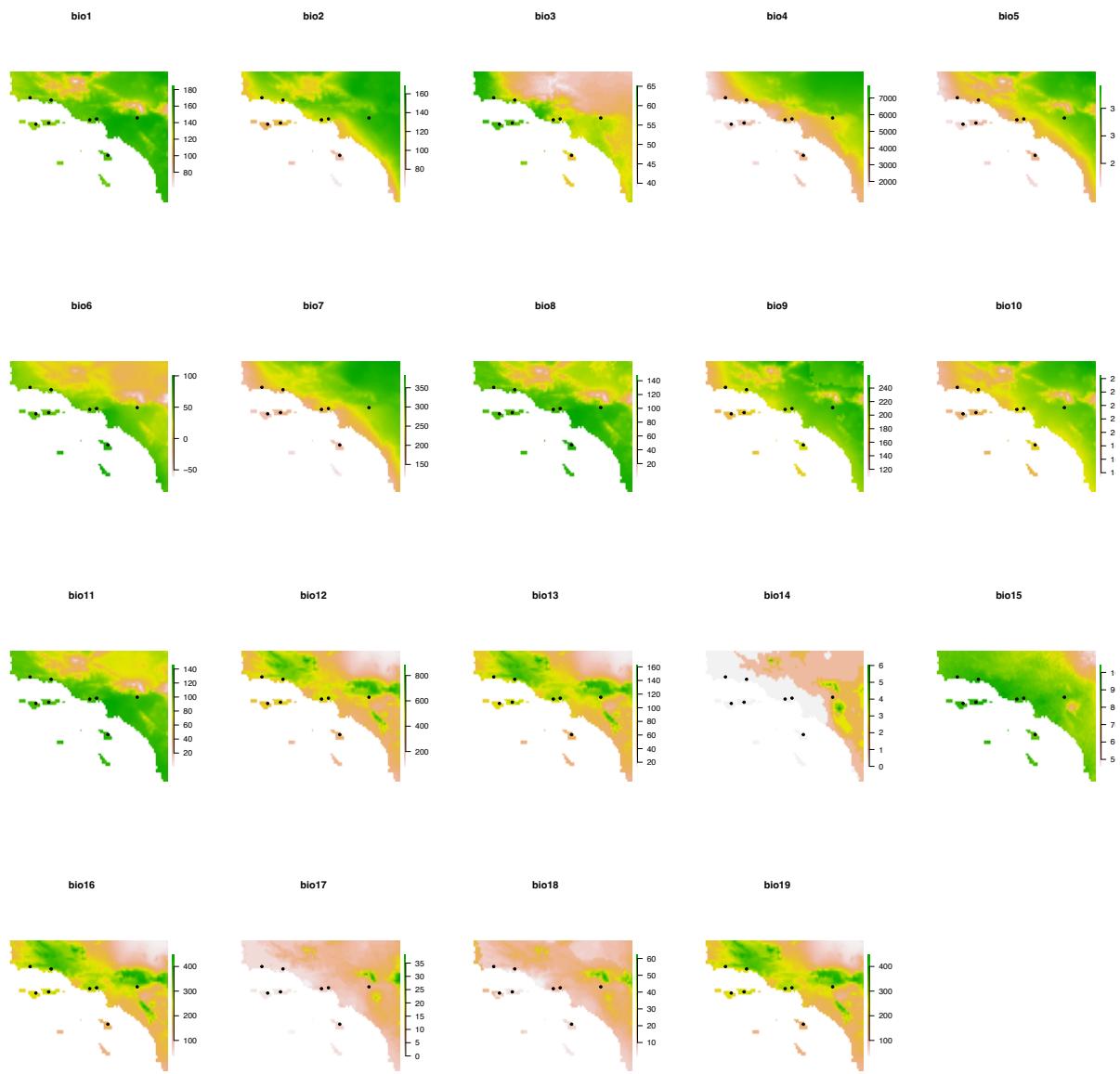


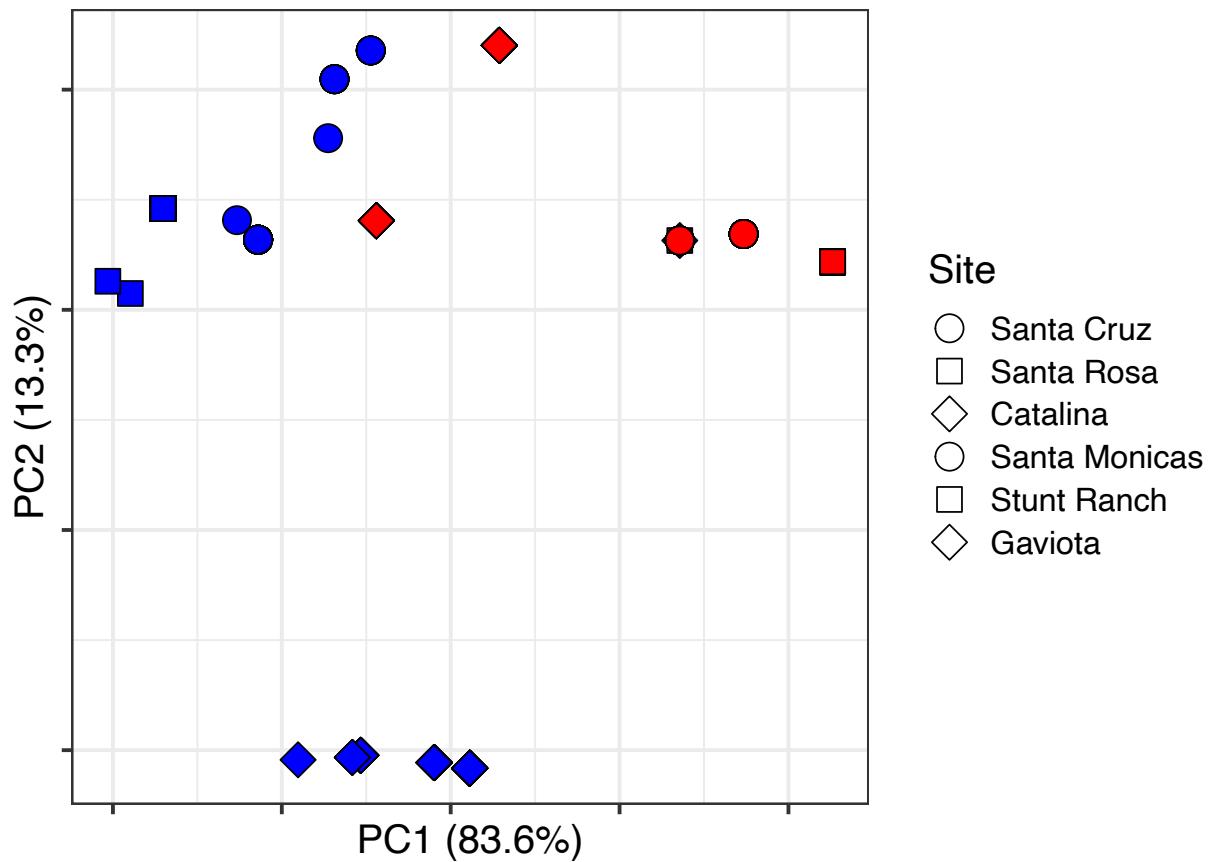
**Figure S1 – Maps of sampling locations for chaparral shrubs across each of the six sampling sites. Each point corresponds to a single plant. Maps were generated using the ggmap package (Kahle and Wickham 2013) and the Google Earth Engine API.**



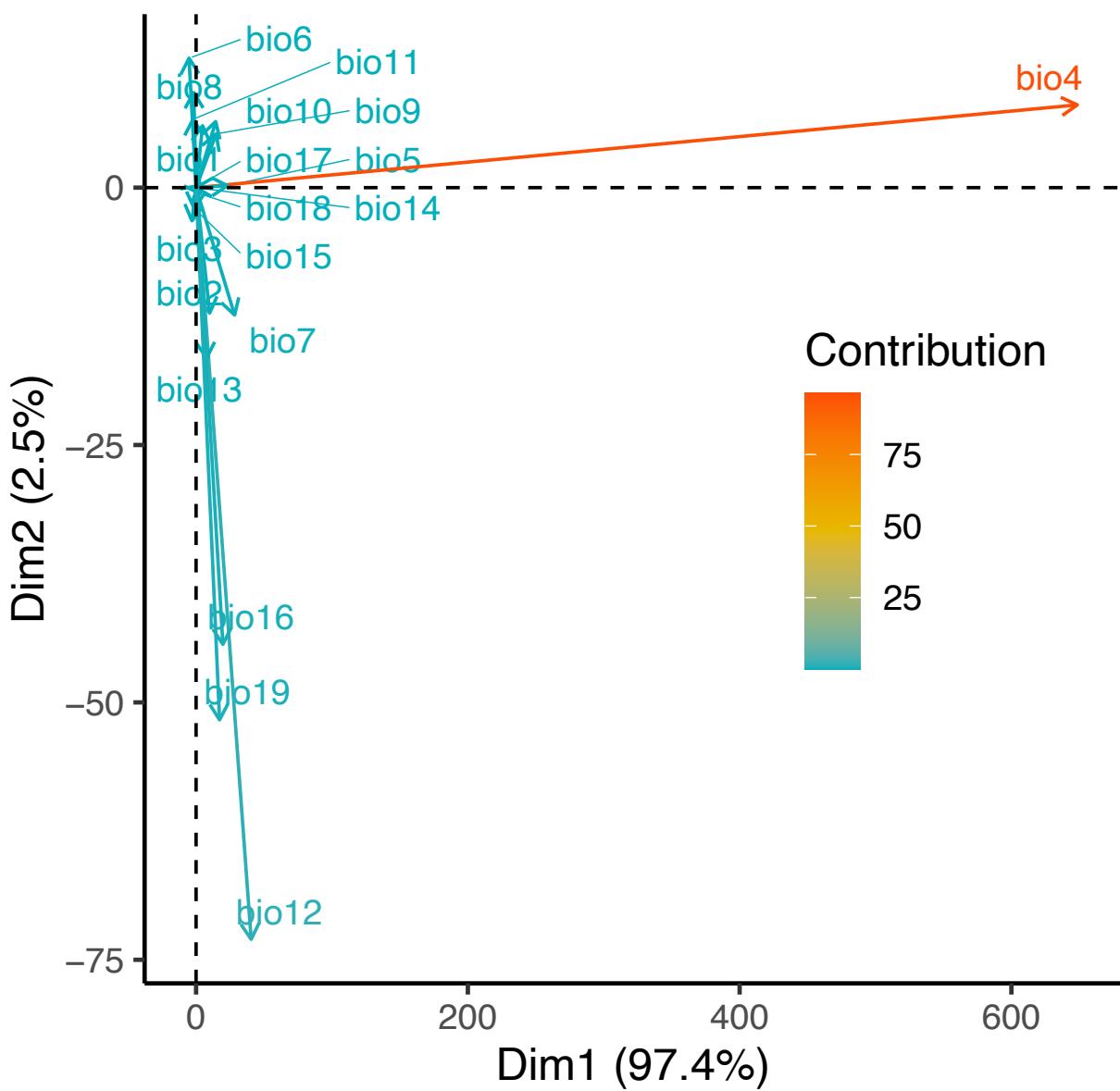
**Figure S2** – Depiction of sampling scheme for chaparral shrub trait analysis. **(A)** When possible, branches were collected from both the upper and lower canopy of focal shrub species. **(B)** Example of scanned leaves from the lower canopy of *Heteromeles* individual #3, sampled from Stunt Ranch (mainland). **(C)** Scanned leaves from *Heteromeles* individual #19, from Santa Rosa Island. **(D)** For each individual leaf (here leaf number 7 from Panel B is shown), we used ImageJ to measure its morphology. After converting each image into black/white pixels, we recorded the leaf area minus the petiole (denoted as A<sub>1</sub>). Spinescence was measured by connecting the vertices of marginal spines using the polygon selection, then filling in the resulting object. The area of this object (A<sub>2</sub>) was then used to determine the spinescence percentage, shown in **(E)**. Herbivory was recorded in a similar manner. Spinescence was coded as 'NA' for samples with herbivory levels > 10% of leaf area removed, and leaves that were determined to be not fully expanded were excluded from analysis. Specific leaf area was determined by summing the cumulative area of each fully expanded leaf (in cm<sup>2</sup>) and dividing this by the cumulative mass of those leaves (in g).



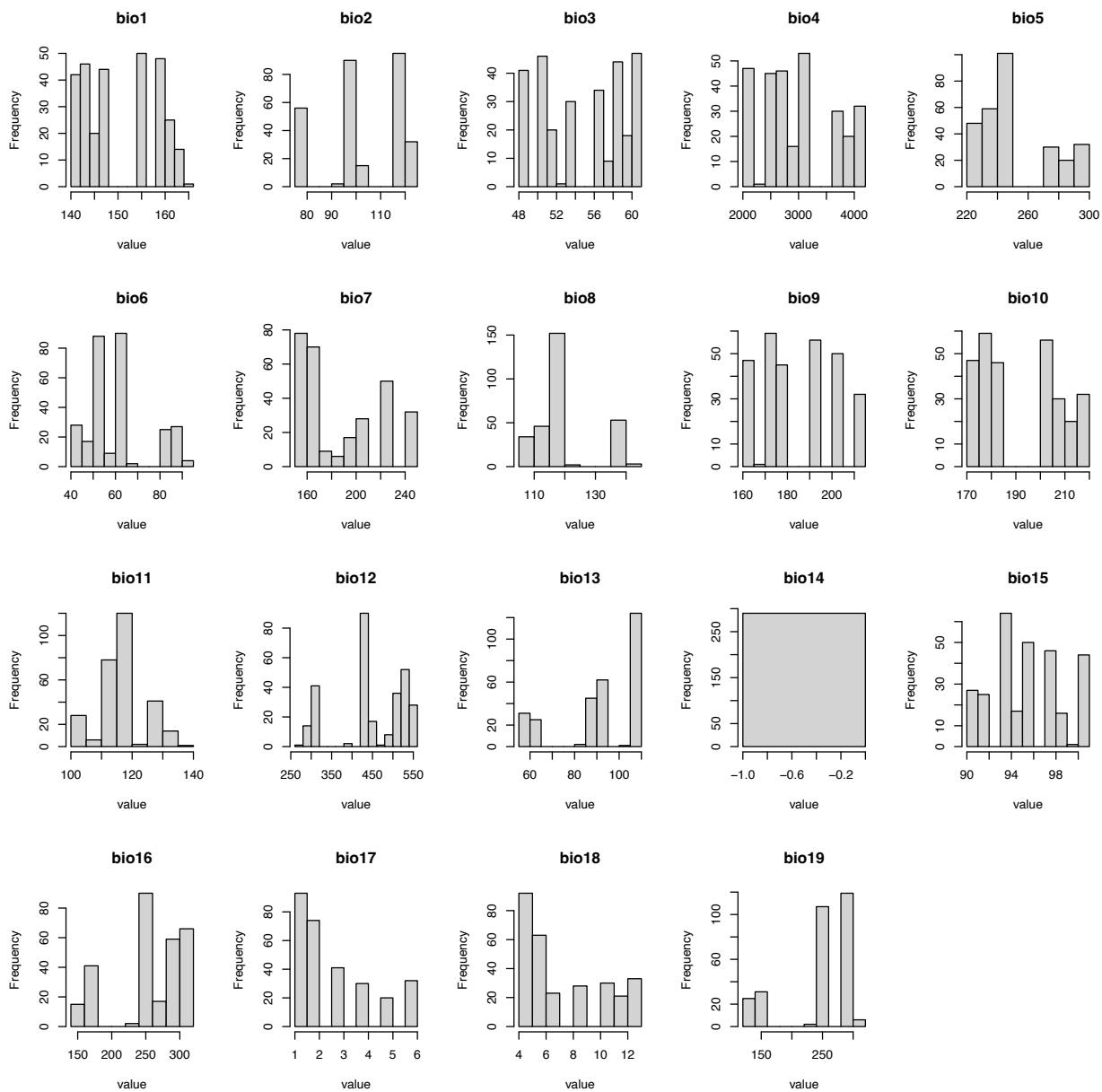
**Figure S3** – Maps depicting variation in each of the 19 recorded bioclimatic variables. Sampling locations (both field and common garden) are shown as black points. **BIO1** = Annual Mean Temperature, **BIO2** = Mean Diurnal Range (Mean of monthly (max temp - min temp)), **BIO3** = Isothermality ( $BIO2/BIO7 \times 100$ ), **BIO4** = Temperature Seasonality (standard deviation  $\times 100$ ), **BIO5** = Max Temperature of Warmest Month, **BIO6** = Min Temperature of Coldest Month, **BIO7** = Temperature Annual Range ( $BIO5-BIO6$ ), **BIO8** = Mean Temperature of Wettest Quarter, **BIO9** = Mean Temperature of Driest Quarter, **BIO10** = Mean Temperature of Warmest Quarter, **BIO11** = Mean Temperature of Coldest Quarter, **BIO12** = Annual Precipitation, **BIO13** = Precipitation of Wettest Month, **BIO14** = Precipitation of Driest Month, **BIO15** = Precipitation Seasonality (Coefficient of Variation), **BIO16** = Precipitation of Wettest Quarter, **BIO17** = Precipitation of Driest Quarter, **BIO18** = Precipitation of Warmest Quarter, **BIO19** = Precipitation of Coldest Quarter.



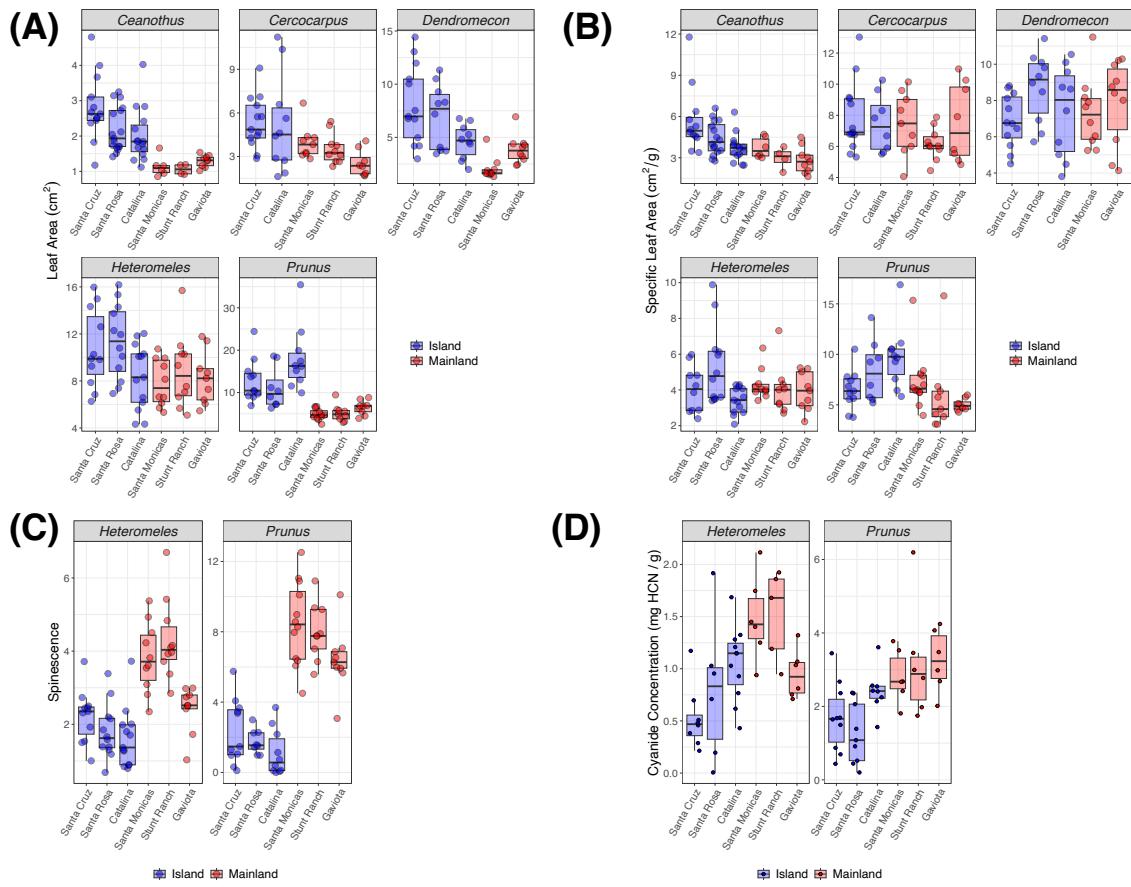
**Figure S4** – Principal component analysis of climatic variation between sampling sites, with islands shown in blue and mainland locations shown in red. Each point corresponds a single 1 km<sup>2</sup> cell, each of which contains multiple sampled plants. Island and mainland locations were differentiated along PC axis 1, which explained 83.6% of overall variation and was dominated by loading corresponding to bio4 (temperature seasonality) (see Figure S5 below). PC axis 2 separated Santa Catalina Island from all other locations and corresponded to precipitation related variables (e.g., bio12 = annual precipitation).



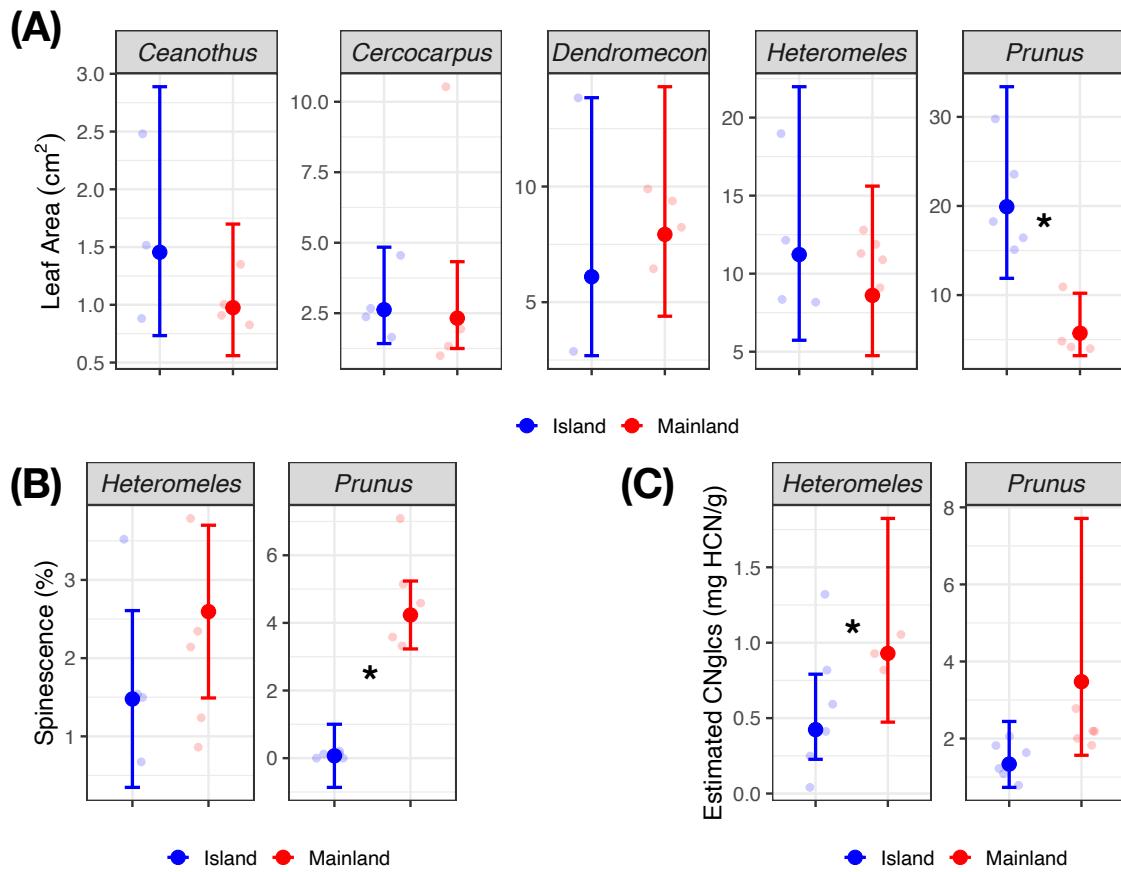
**Figure S5** – PCA biplot showing contributions of each climate variable to overall loadings. Overall differentiation among sampling locations is dominated by a single bioclimatic variable (bio4 = temperature seasonality).



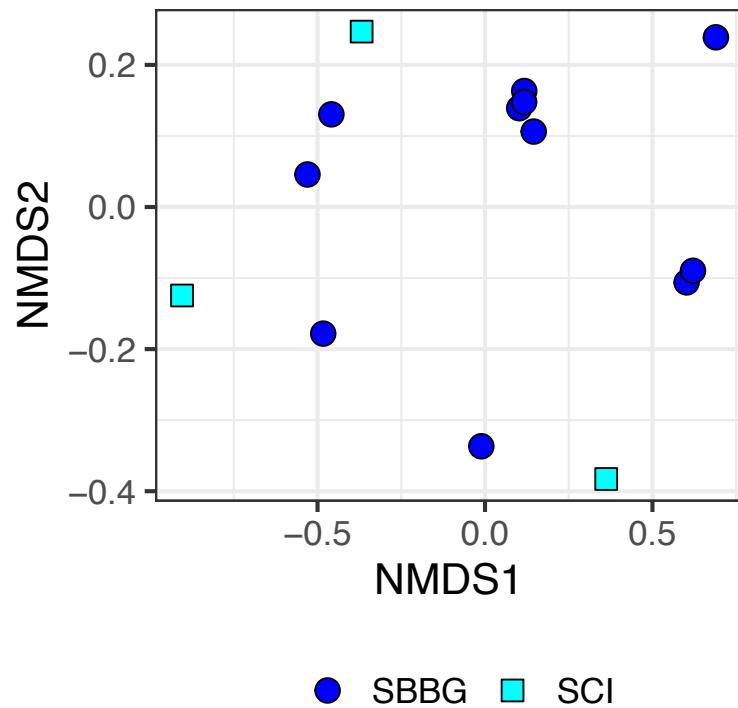
**Figure S6** – Histograms showing the number of observations falling into each bioclimatic variable bin for all 291 field sampled plants. Note that we captured relatively little overall variation in climate space because of the limited spatial extent of our sampling; hence, most bioclimatic variables include 10 or fewer grid cells with unique values. All sampled grid cells received values of 0 for bio14 (precipitation of driest month). **BIO1** = Annual Mean Temperature, **BIO2** = Mean Diurnal Range (Mean of monthly (max temp - min temp)), **BIO3** = Isothermality (BIO2/BIO7) ( $\times 100$ ), **BIO4** = Temperature Seasonality (standard deviation  $\times 100$ ), **BIO5** = Max Temperature of Warmest Month, **BIO6** = Min Temperature of Coldest Month, **BIO7** = Temperature Annual Range (BIO5-BIO6), **BIO8** = Mean Temperature of Wettest Quarter, **BIO9** = Mean Temperature of Driest Quarter, **BIO10** = Mean Temperature of Warmest Quarter, **BIO11** = Mean Temperature of Coldest Quarter, **BIO12** = Annual Precipitation, **BIO13** = Precipitation of Wettest Month, **BIO14** = Precipitation of Driest Month, **BIO15** = Precipitation Seasonality (Coefficient of Variation), **BIO16** = Precipitation of Wettest Quarter, **BIO17** = Precipitation of Driest Quarter, **BIO18** = Precipitation of Warmest Quarter, **BIO19** = Precipitation of Coldest Quarter.



**Figure S7** – Boxplots showing distribution of plant-level mean values from field sampling for leaf area (A), specific leaf area (B), marginal leaf spinescence (C), and cyanogenic glycoside content (D).



**Figure S8 –** Trait values for each species across island and mainland locations, based on common garden sampling. Model-estimated marginal means and 95% confidence intervals are shown with solid points and lines. Each pale dot corresponds to a single plant-level mean, which is itself the mean of leaf traits from branches in the upper and lower canopy. Measured leaf traits were (A) leaf area, (B) marginal leaf spinescence, and (C) concentrations of cyanogenic glycosides (*Heteromeles* and *Prunus* only). Asterisks correspond to significant ( $p < 0.05$ ) differences between island and mainland plants within each species x trait combination.



**Figure S11** – Ordination of *S. bullata* leaf chemical profiles for genotypes from Santa Cruz Island grown in two common gardens: SBBG (Santa Barbara Botanic Garden) and SCI (Santa Cruz Island field station). Garden location did not affect leaf chemistry.