Living Carbon field sampling:

On a monthly basis:

1. Monitor pre-dawn water stress to evaluate changes in soil-moisture.
2. Measure diurnal changes in:
   1. Stomatal conductance (Li600)
   2. øPSII (Li600)
   3. Leaf temperature (li600)
   4. Assimilation (Li6800 – lower intensity)
   5. JO (from measurement of A, Rd and ETR – dependent on øPSII to øCO2 model derived from non-photorespiratory conditions)
3. Diurnal and light response curves of high and low PLGG1 trees under non-photorespiratory conditions (used for calibrating relationship between øPSII and øCO2)
4. Score for drought-related phenotypes such as leaf drop as needed.

To-do

* 1. Sampling intensities for pre-dawn water potential
  2. Write protocol. (Stratified random sampling based on height? – grid sampling)
  3. Put N2 tank in field.
  4. Sampling intensities for stomatal conductance
  5. Devise double sampling scheme for pairing stomatal conductance and Assimilation measurements to improve precision of the latter.
  6. Write sampling protocol.
  7. Locate low O2 gas source, put in field.
  8. Develop protocol for light response curves.
  9. Probably group by high, mid and low PLGG1 groups and seek to have 3 curves each.
  10. Develop sampling intensities and protocol.
  11. Have at least three leaves per group per month.

Specific monitoring days (repeat at least 7 times) (2-day length)

Per tree:

1. A-CO2 curve.
2. A-Q curve
3. Midday or afternoon water potential
4. Leaf collections to dry (of measurement leaf after photosynthesis measurement)
5. SPAD (of measurement leaf)

Once or twice per season

1. Leaf punches for gene expression analysis. (n=100)
2. Analysis of metabolites under high stress and low stress conditions. (couple with quantification of stress (pre-dawn water potential).
3. Leaf collection and sampling of # of leaves and branches (crown area)
4. Competition reduction: Mowing and weed whacking around trees.

Analysis Plan

1. Effect of seasonal drought on assimilation, stomatal conductance, photosynthetic electron flow and photorespiration.
   1. Plot diurnal curves for each event (or events grouped by PLGG1 level) for each month.
   2. Possibly consider adding irrigation treatment (even if it is just 2 trees per event)