How to Evaluate Your Site for Dry Farm Potential

Dry farming is the practice of producing crops without irrigation during a dry growing season. Some of the site factors that have been associated with dry farm productivity in the Willamette Valley are soil AWHC, soil pH, soil nutrient concentrations, climate (region), weather (year), and microclimate (site).

Soil available water holding capacity (AWHC)

- A soil's AWHC is the amount of plant available water that it can hold (to a 5 ft. depth).
- AWHC can be estimated by assessing the texture and depth of the soil's horizons.
- For the soil presented on the right, the AWHC is 10.2 inches in the first five feet. In our trials, site AWHC ranged from 3-13 inches in the first five feet.

Soil AWHC is related to dry farming success

- The most suitable soil for dry farming in the Willamette Valley is a deep silt loam or a silt clay loam with a high AWHC.

Soil Core / Profile Description

- The best way to understand your soil is to have a 5 foot soil core extracted from your dry farming field and analyzed by a soil scientist to determine depth and texture of soil horizons, soil series, and soil available water holding capacity. An example core is presented on the right.

Horizon (depth)	Texture	AWHC (in)
Ap (0-9")	Silt Loam	1.8
A2 (9-12")	Silt Loam	0.6
E (12-18")	Silty clay loam	1.1
Bt1 (18-26")	Clay	1.0
Bt2 (26-38")	Clay	1.4
BCt (38-44")	Silty clay loam	1.1
C (44-60")	Silt loam	3.2

Soil Texture Classes	AWHC (inch/inch)
Sandy loams	0.11-0.15
Silt loams	0.20-0.24
Silty clay loams	0.18-0.23
Clay loams	0.14-0.19
Silty clays	0.10-0.14

A soil's AWHC is calculated by multiplying the depth of each soil horizon by the AWHC of that soil horizon's soil texture class and then summing up all AWHCs.

Nutrient management

- pH and nutrient concentrations also relate to yield and productivity, so it is important to understand your soil's chemical properties and to correct any issues/deficiencies.
- At the same time each year, collect and aggregate soil samples from 0-6 inch depth and send in for analysis.
- Instructions for collecting, submitting, and shipping samples can be found at: https://smallfarms.oregonstate.edu/soil-testing
- Understand your soil test: https://catalog.extension.oregonstate.edu/ec1478
- Nutrient management guide: WSU Soil Fertility in Organic Systems https://s3.wp.wsu.edu/uploads/sites/2074/2019/01/Soil-Fertility-in-Organic-Systems-1.pdf

Climate, weather, and microclimate

- In the Willamette Valley, we have found that summers that are hotter and drier than normal are associated with reduced crop yields.
- Temperature, relative humidity, and wind speed influence crop water loss by evapotranspiration.
- Drought tolerant, drought resistant, or early-maturing cultivars may be better equipped for dry farming. Consult dry farm variety trial reports to select varieties.
- Data loggers collect humidity and temperature data throughout the season. Data can be used to describe and compare sites in their climate and microclimate (see below).
- Site microclimate is a reflection of its location in the broader landscape (valley floor, foothills, swale, exposure).
- Sheltering (hedgerows, shade structures) changes microclimate by slowing wind speed and reducing irradiance. Consider how to manipulate your site's microclimate to reduce wind speeds or irradiance on your site.

Kestrel Drop D2 and radiation shield. Not to scale.

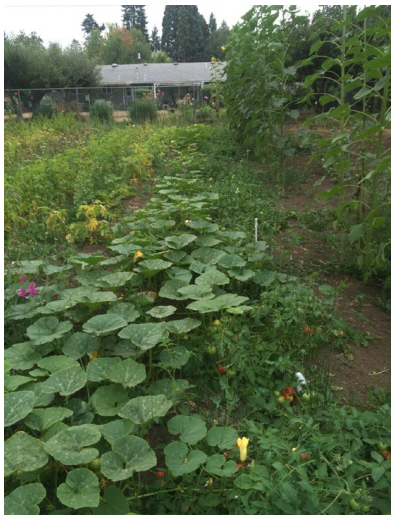

Photo on left: sheltered site where trees shade the crop and block wind

Photo on right: exposed site, no barriers to strong winds.

Additional Resources

Information on your site's climate can be found at: http://prism.oregonstate.edu/explorer/

Information on your site's soil (including AWHC) can be found at NRCS: http://websoilsurvey.sc.egov.usda.gov

Funding for this project provided by

WESTERN SARE Sustainable Agriculture Research & Education

USDA Risk Management Agency
United States Department of Agriculture