



## Make Your Garden More Climate-Resilient: Plants

Earth's current warming trend results in melting glaciers, rising sea level, increasing ocean acidity, and more frequent and severe droughts and floods. The Pacific Northwest has seen prolonged drought, increasing wildfire incidence and severity, heat waves, insect outbreaks, and tree diseases. Reduced snowpack results in earlier peak flows in rivers and streams which reduces water supplies. In addition to these trends, climate change brings erratic, extreme weather events (heat wave, heavy rain) in greater frequency.

<https://blogs.oregonstate.edu/occri/oregon-climate-assessments/>

How do we garden in these times? This handout offers ideas for building resiliency into the garden via plant choices and growing practices.

### What We Know

- USDA Cold Hardiness Zone was a main consideration for plant selection. Hardiness zone is calculated using a location's average low temperatures for the past 30 years. The warming trend has necessitated its update and we expect zone designations will shift.
- The warming climate makes a plant's heat tolerance and water needs an important criteria in garden use. We gain indications of a plant's requirement from its native environment. Additional clues come from leaf colors (silver color leaves reflect light, red anthocyanin increases stress tolerance), texture (hairy surface or waxy coating reduces water loss), size/shape (small leaves, curled/narrow forms lose less moisture).
- Plants can be categorized into three photosynthesis groups: C3, C4 and CAM types. Most plants are of the C3 type, which close stomata (pores) when it's too hot. During this period, photorespiration, a wasteful sidetrack of photosynthesis, is more likely to happen.  
<https://ripe.illinois.edu/blog/difference-between-c3-and-c4-plants>
- C4 and CAM plants have adaptations to minimize photorespiration. Examples: C4 (corn, sugar cane, crab grass), CAM (Cacti, succulents, pineapple, jade plant, Aeonium, Sedum, orchid, Agave). <https://askabiologist.asu.edu/cam-plants>
- Vegetables and annual ornamental plants thrive in rich soil and plentiful water. In contrast, pampered growing conditions for longer-living plants (trees, shrubs, perennials) can lead to tender shoots inviting pests to feast upon, and a weak structure prone to injury from snow, ice, and wind.

### Potential Climate Mitigation

- Select plants that can tolerate heat or even thrive in heat in your climate.
- Select plants that require little to no supplemental water after establishment.
- Select strong performers. If a particular plant did well during a heat wave or extreme weather event, consider adding more.
- Adjust planting calendar to take advantage of a longer growing season.

### What To Do

- Adjust planting calendar

- The warming climate avails the opportunity to plant earlier in the spring and to continue growing into fall.
- Early spring and late fall growing has the risk of sudden cold spells, heavy rain, and/or extended drought. Making garden soil more climate resilient and using season extenders can moderate risk and improve plant performance.
- Use climate-adapted plants. The origin of a plant gives clues to its cultural requirement. Select plants that match your garden conditions and the level of care you can provide. Native plants of your ecoregion are good candidates if their habitat is similar to conditions in your garden. For Pacific Northwest gardens, many Mediterranean-origin plants match the summer dry, winter wet climate. They do well in sunny areas that have free-draining soil containing low organic matter. CAM plants are well-adapted to hot summers and can be used strategically in the garden.
- Use plant trial results
  - Northwest Plant Evaluations  
Oregon State University, field trial on drought-tolerance and cold hardiness of five genera listed below, <https://horticulture.oregonstate.edu/nursery-greenhouse-and-christmas-trees/production/northwest-plant-evaluations>
    - Arctostaphylos, <https://agsci.oregonstate.edu/arctostaphylos-manzanita-evaluation-western-oregon>
    - Ceanothus, <https://agsci.oregonstate.edu/ceanothus-evaluation-landscapes-western-oregon>
    - Grevillea, <https://agsci.oregonstate.edu/evaluating-grevillea-western-oregon>
    - Hebe, <https://agsci.oregonstate.edu/hebe-landscape-evaluation>
    - Rockrose, <https://agsci.oregonstate.edu/rockrose-cistus-spp-and-halimium-spp-evaluation-western-oregon>
  - Climate Ready Landscape Plant Project  
Five universities field trial on drought-tolerance: Utah State University (Logan, UT), Oregon State University (Aurora, OR), Arizona State University (Tucson, AZ), University of Washington (Seattle, WA) <https://botanicgardens.uw.edu/science-conservation/climate-ready-plants/> and University of California
    - University of California Trial, in Davis and Irvine, CA <https://ucanr.edu/sites/UCLPIT/>
  - Chicago Botanic Garden Trials, test performance in US Upper Midwest [https://my.chicagobotanic.org/category/science conservation/plant evaluation/](https://my.chicagobotanic.org/category/science%20conservation/plant%20evaluation/)
  - Mt. Cuba Center Trials, test performance in the US Mid-Atlantic region <https://mtcubacenter.org/research/trial-garden/>
  - All-America Selection, field trial locations vary, <https://all-america-selections.org/about-aas-winners/>
- Consult recommendations from professionals
  - Great Plant Picks, Miller Botanical Gardener, contains over 1,000 plants in a database that can be sorted by site conditions such as sun or shade and attributes such as plant size and foliage color, <https://greatplantpicks.org/>
  - Perennial Plant of the Year, <https://perennialplant.org/page/PPOY>

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