

Drought Impacts and Mitigation Strategies for Annual & Perennial Crops



Cindy Fake
Horticulture & Small Farms Advisor
UC Cooperative Extension, Placer & Nevada Counties

Drought Impacts on Perennial Crops



Key concepts

- Winter drought can impact perennial plants, even if they are dormant
- Impacts can be particularly severe on young plants and older plants
- Many woody perennials prune their roots in drought
- Most woody perennials leaf out or produce leaf growth flushes first then...
- Once those leaves fully expand, then root growth occurs



Drought Impacts on Perennial Crops



Key concepts

- When roots are pruned, root absorbing surface and volume of soil mined for water and nutrients decreases
- Tree/vine cannot feed itself as well: nutrient status may be affected
- When it leafs out or new growth flushes, it may not have the root mass to sustain them
- STRESS =>poor health
- Worst case - plant death



Drought Impacts on Perennial Crops



- Symptoms may include:
 - Upward curling or rolling of leaves
 - Yellowing and/or browning of leaves, particularly along leaf margins interior needle and leaf drop on conifers
 - leaf, blossom, and fruit drop
 - under-sized leaves
 - twig and branch dieback
 - Plant death
- Monitor trees and vines for symptoms of drought stress



Scorched plum leaves



Early drought stress in citrus leaves

Long-Term Drought Impacts on Perennial Plants

- Increased susceptibility to insect infestations; especially borers in stone & pome fruit
- Increased susceptibility to disease
- Decreased winter hardiness
- Root death and consequent impacts on canopy
- Twig and branch dieback in the upper canopy
- Plant death



Mitigating Drought Impacts



- Monitor and calibrate your irrigation system each season
- Consider converting to a low volume irrigation system - NRCS EQIP funding available
- Schedule irrigations and set times according to soil type, weather, growth stage
- Monitor soil moisture to schedule irrigations



Matrix blocks



Tensiometer

Mitigation Strategies: Orchard & Vine Crops

- Avoid irrigating row middles
- Use 2-4" of organic mulch/compost along rows or around trees
- Mulch retains soil moisture & reduces plant stress
 - Organic materials: rice straw, compost, wood chips, etc.



Increase Soil Organic Matter

- A 1% increase in soil organic matter increases soil water storage by 16,000 gallons/acre-foot of soil!
- Winter cover crops
 - Increase soil organic matter
 - Improve infiltration
 - Minimize rainfall runoff
- Do not disk permanent crops – plant cover crop or nurture native cover



Drought Mitigation Strategies: Vegetable Crops

- Use organic mulch between rows
- Organic mulch on beds conserves water better than plastic mulch
- Sow summer and/or winter cover crop:
 - Increases soil organic matter
 - Increases water-holding capacity in decomposed granite soils



Drought Stress and Pest Management

- Drought stress can exacerbate insect and disease problems
- For more information on pest management, visit www.ipm.ucdavis.edu

