Arbutus Update

Interactions among soil conditions, root growth, and overall tree success

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David Bergendorf, MS, UW
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Overview of research

Cahill, A. and L. Chalker-Scott. 2001. The role of soil environment in *Arbutus menziesii* (Pacific madrone) seedling success. American Nurseryman 193 (8):26-34.

David Bergendorf. 2002. The influence of soil properties on the morphology and health of the Pacific madrone (*Arbutus menziesii* Pursh) in Seattle public parks. MS Thesis, University of Washington.

Soil texture and compaction effects on madrone health

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Compaction

Clay and sandy loams

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Experimental setup and watering regime

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Sandy vs. clay soil, uncompacted

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Sandy vs. clay soil, moderately compacted

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Sandy vs. clay soil, highly compacted

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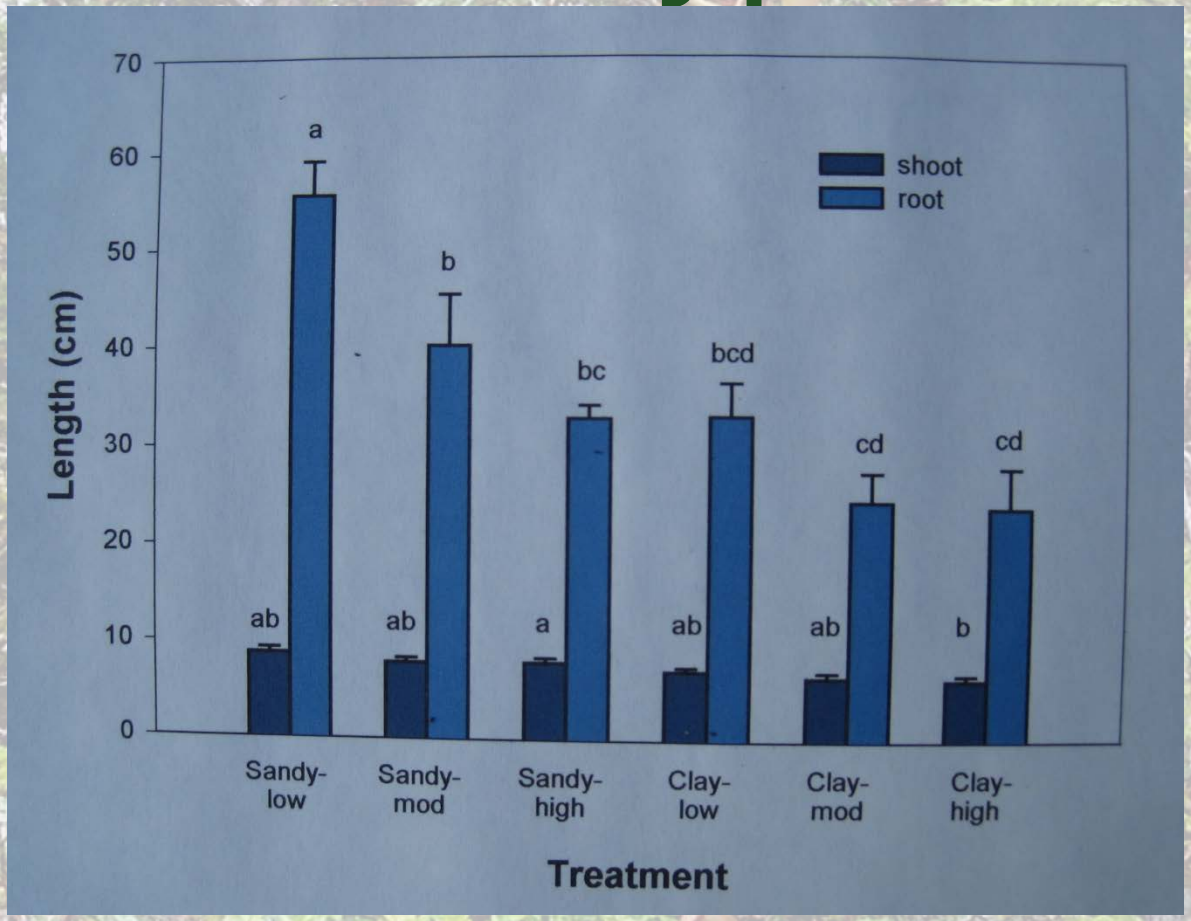
Root/shoot growth and soil type



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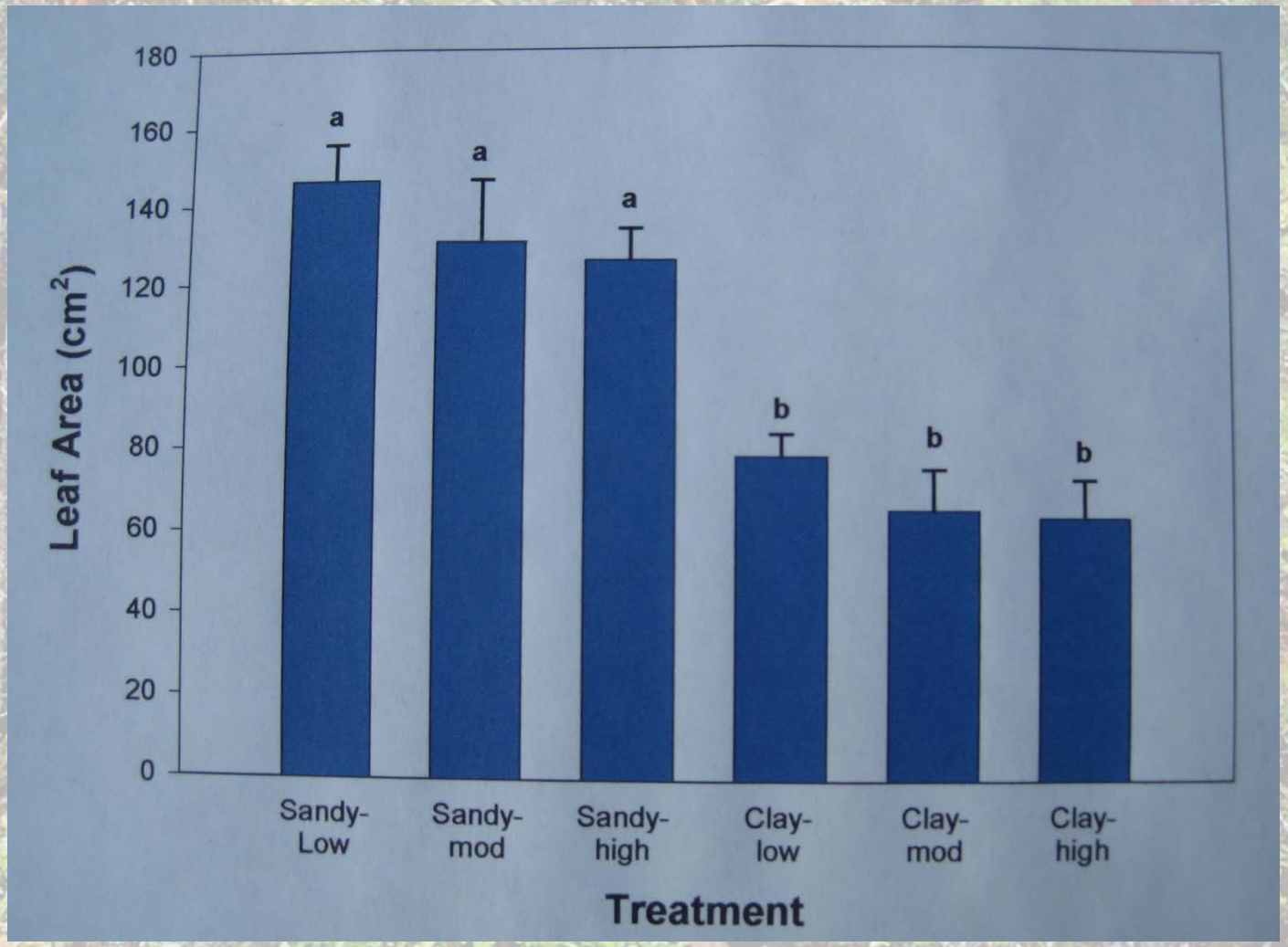
Leaf size and soil type



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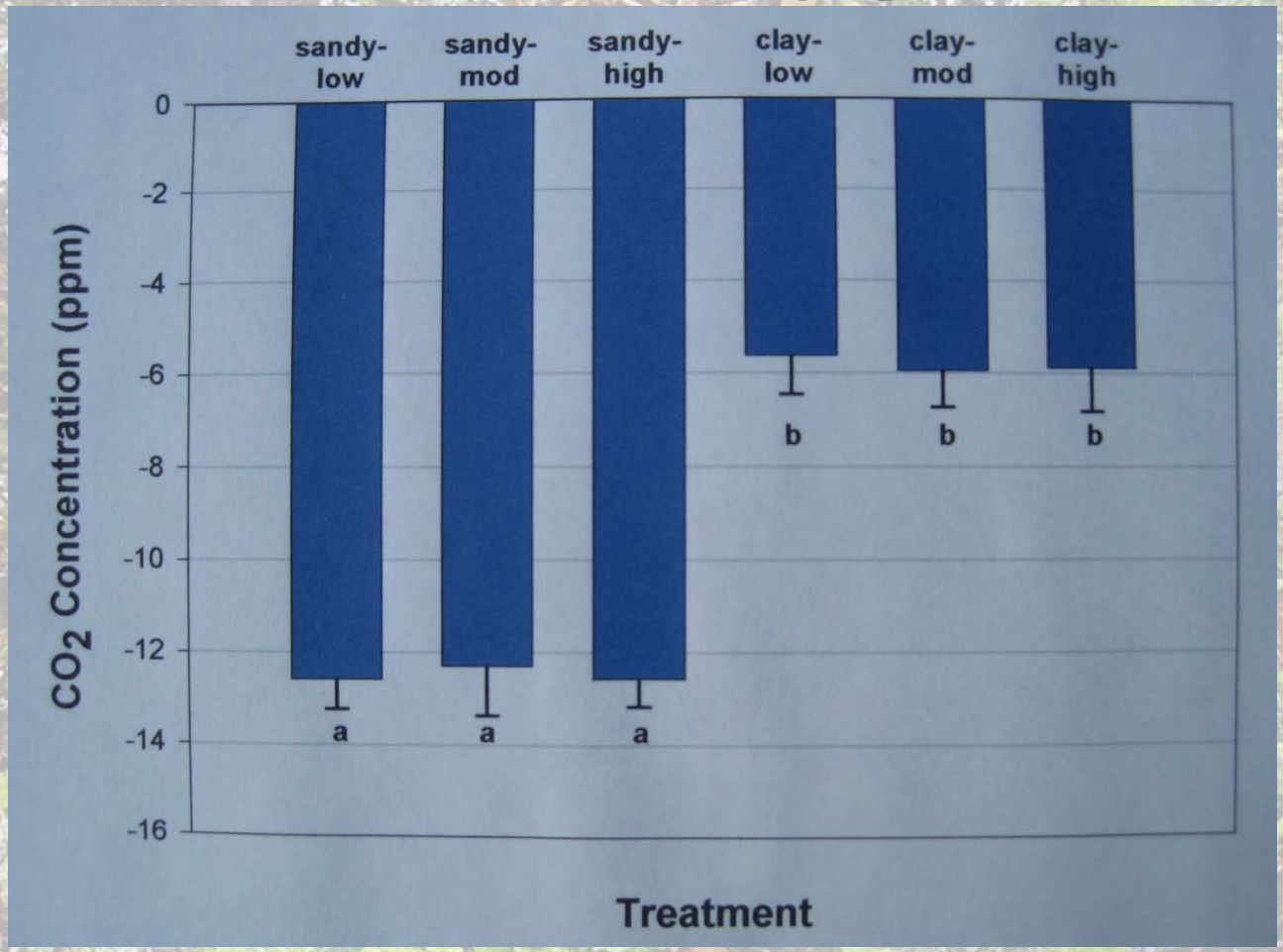
Photosynthetic rates and soil type



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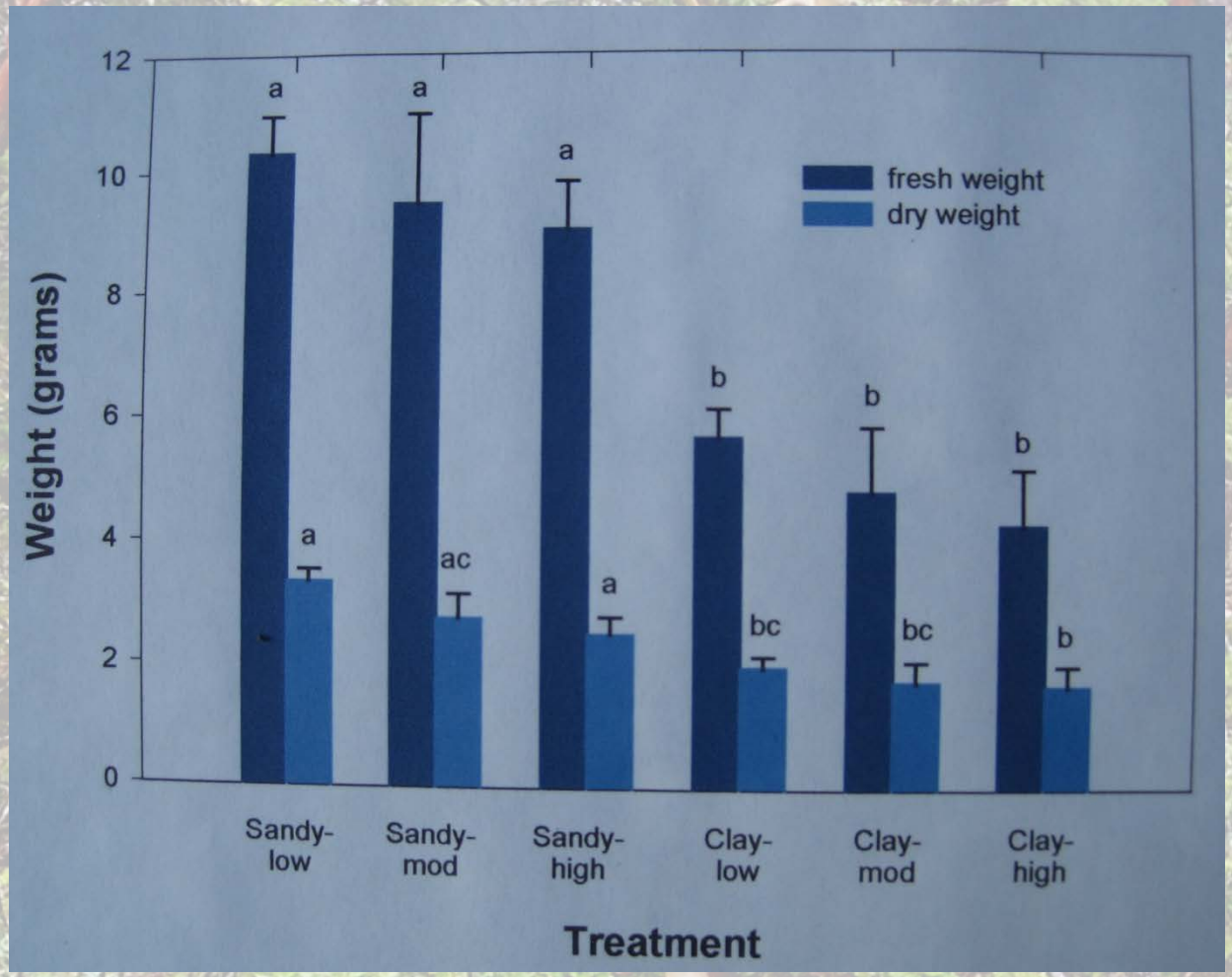
Plant weight and soil type



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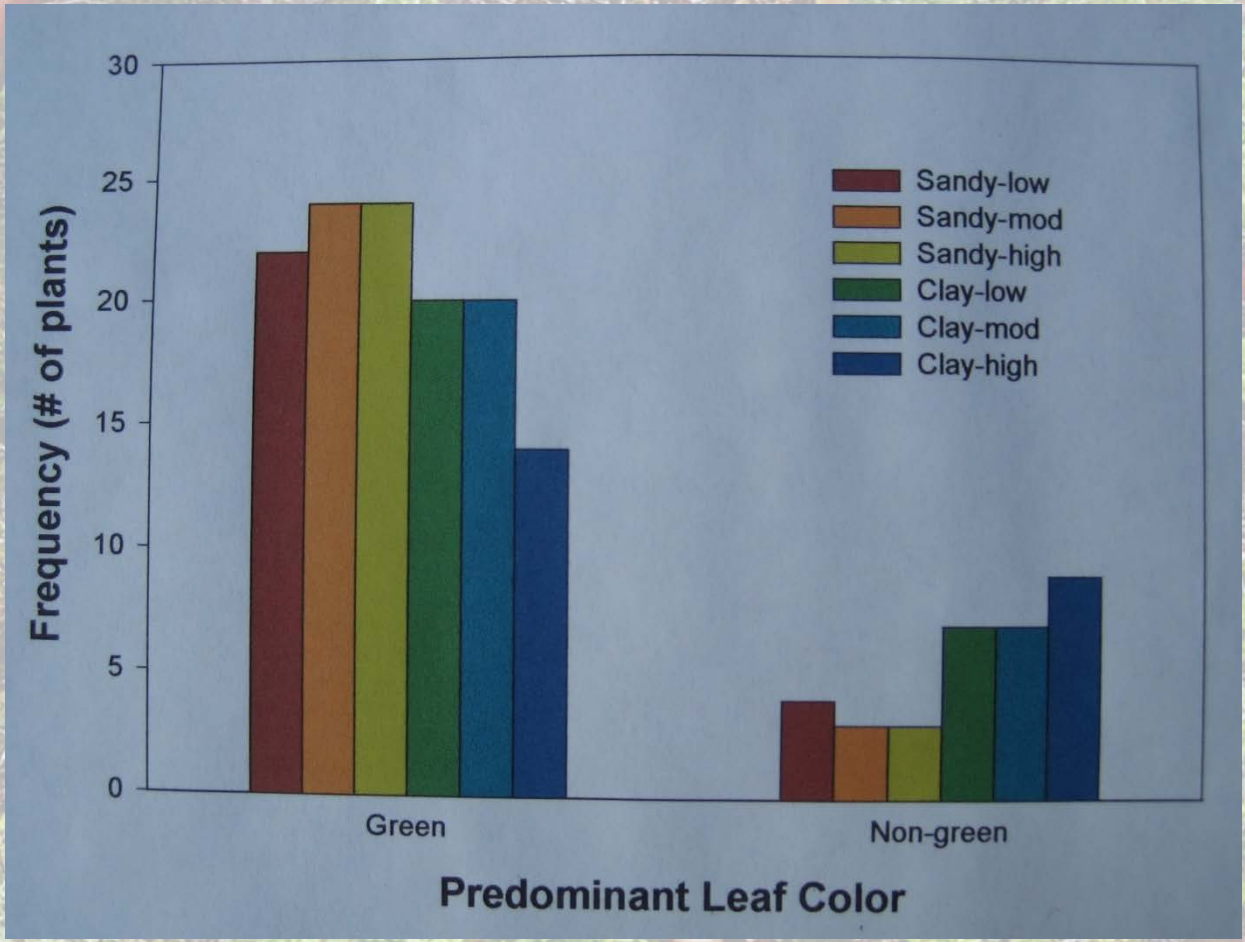
Leaf redness and soil type



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Correlation between soil characteristics and field madrones

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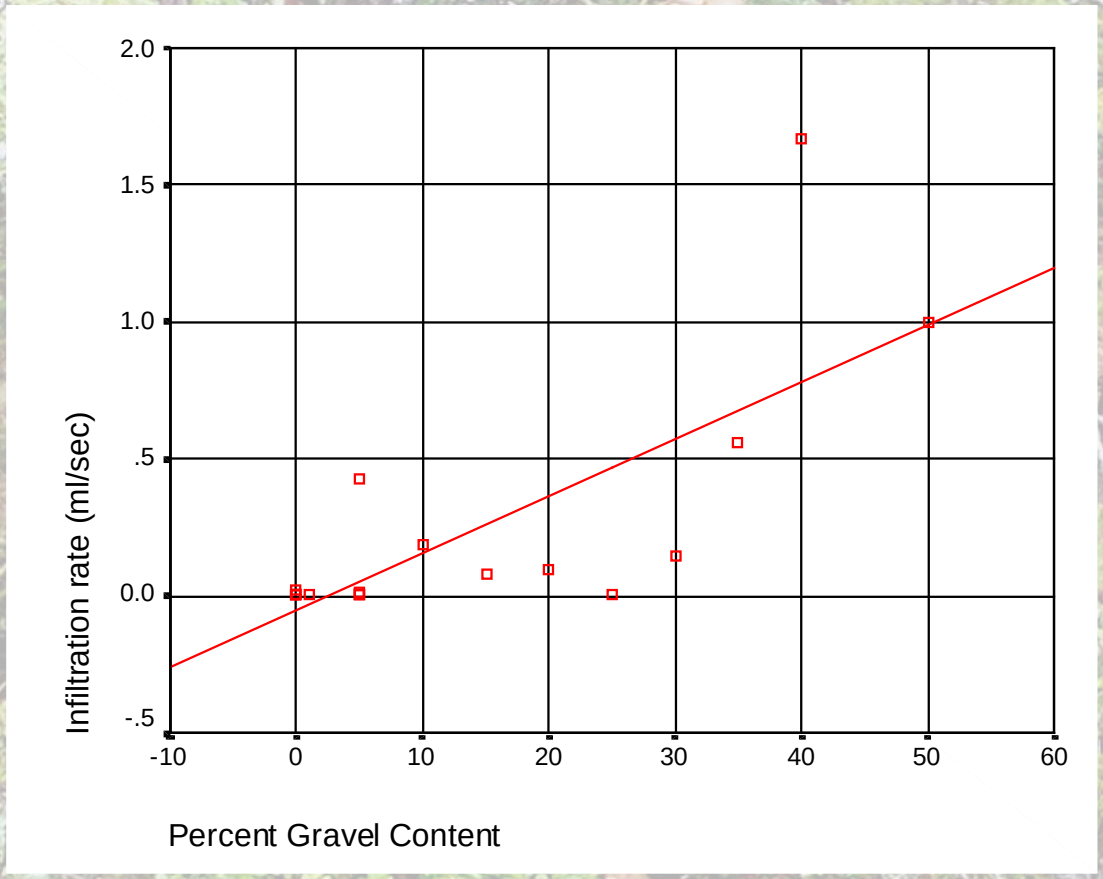
Soil gravel content and water movement



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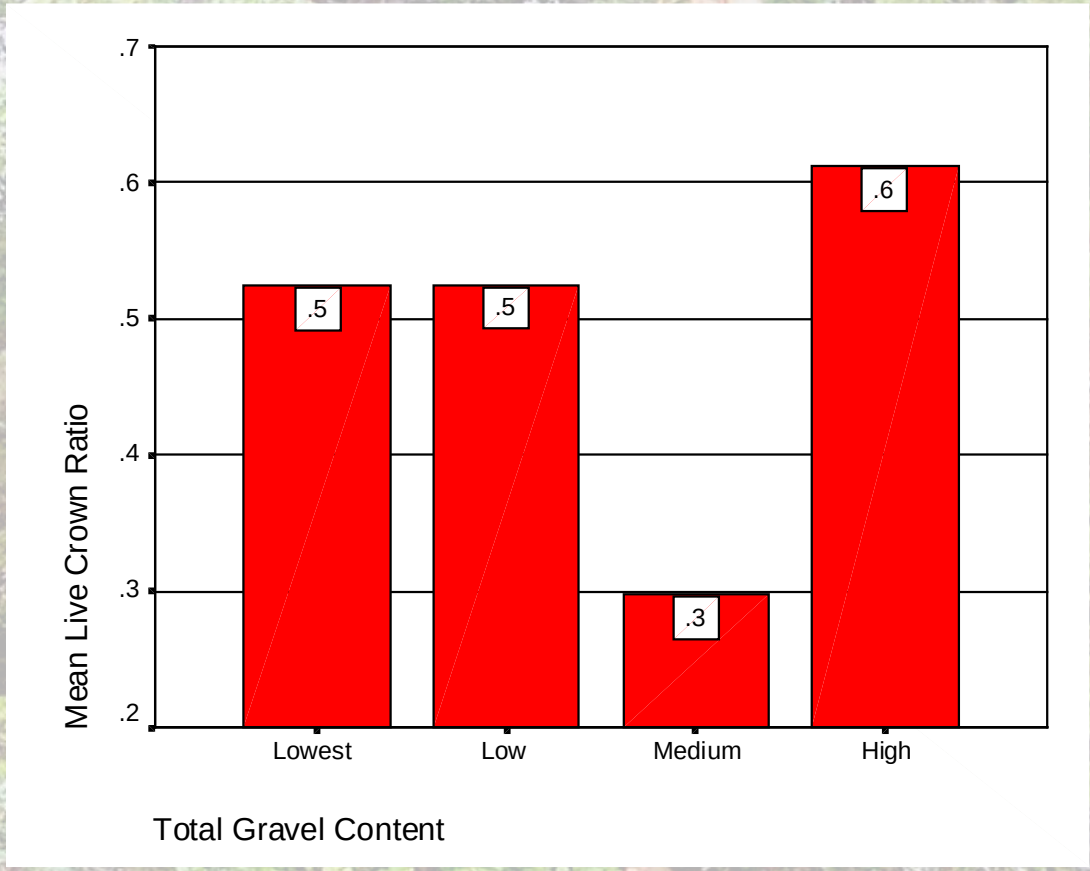
Live crown and soil gravel content



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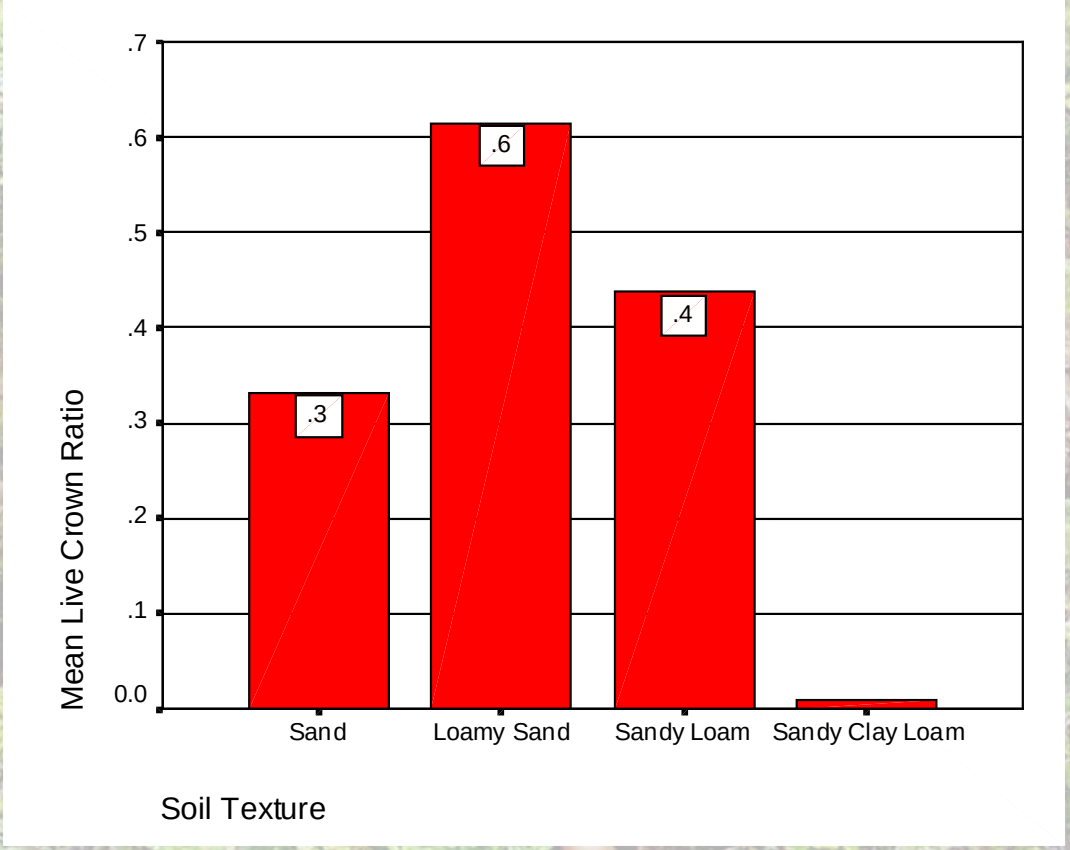
Live crown and soil texture



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Research conclusions

- Compaction and texture significant in reducing growth and photosynthetic rates
- Texture was more important than compaction
- Clay loam and heavily compacted soils decreased photosynthesis, increased anthocyanin production, and decreased shoot and root growth, leaf area, and biomass
- For field trees with live crown ratio measurements of < 0.61, health improves with soils of higher gravel content

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Recommendations for managing madrones in the landscape

- Plant madrones in coarse, well-drained soils
- Don't apply fungicides to madrone root zones
- Don't routinely apply fertilizers to madrone root zones Prevent soil compaction by applying thick (4-6") layers of coarse woody mulch such as arborist wood chips
- Install fences around and/or build raised boardwalks over madrone root zones in heavily trafficked areas

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