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SUMMARY

Although boron is an essential plant nutrient, excessive amounts can become toxic. Since no remedies exist for excess boron in well water, stick to boron-tolerant plants in the landscape.

Boron in Irrigation Water

by Emma Connery, UC Master Gardener Program Coordinator

High concentrations of boron in irrigation water can cause havoc in your landscape.

Q. I recently had my well water tested and the results indicated I have a high concentration of boron. Do you have a list of plants that are boron tolerant?

A. Contra Costa County has areas where the boron levels in groundwater are quite high. In water analysis reports boron concentration is typically measured in milligrams per liter (mg/l). Less than 0.5 is generally safe, 0.5-1.0 is slight to moderate, and greater than 1.0 is considered severe. You did not mention the level of boron in your test results but some areas of the county have boron levels well into the severe range.

An Essential Nutrient:

Boron is one of the essential plant nutrients required by plants for healthy growth but it is only needed in very small amounts and can therefore become toxic to plants even at very low concentrations. Boron toxicity symptoms can vary between types of

plants and species. Landscape plants typically first show a burning effect at the tips and edges on older leaves while fruit and nut trees may not show those leaf symptoms but rather show ooze or cankers on limbs or trunk .

No Remedies for Well Water:

Unfortunately, there is nothing you can do to your well water to reduce its level of boron so selecting boron-tolerant plants is a wise direction to take. You did not indicate what types of plants might interest you – groundcovers, landscape shrubs or trees, fruit or nut trees, turfgrass, or vegetables, but some published resources are available.

Boron Tolerant Plants:

The University of California publishes a reference book entitled *Abiotic Disorders of Landscape Plants*. Table 5.7—Salt and Boron Tolerance of Selected Landscape Plants—lists numerous plants that have at least some tolerance to boron. These plants are summarized in Table 5.9.



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Low tolerance indicates those plants that prefer boron levels no greater than 0.5-1.0 mg/l. Moderate tolerance plants prefer a range of 1.0-2.0 mg/l. High tolerance plants should tolerate levels in the 2.0-10.0 mg/l range. This reference book can be purchased at online or at book stores, or it may be available at your local public library. To purchase online, visit:

<https://anrcatalog.ucanr.edu/pdf/8368.pdf>

Online Resources:

A shorter list of boron-tolerant plants is included in a UC publication entitled *Landscape Plant Salt Tolerance Selection Guide for Recycled Water Irrigation*. This report can be obtained at:

<http://slosson.ucdavis.edu/files/215300.pdf>

Also, the Food and Agriculture Organization (FAO) of the United Nations has developed a list of agricultural crops and their tolerance to boron. That list is available at:

<http://www.fao.org/DOCREP/003/T0234E/T0234E05.htm#ch4.1.3>



Prospector Elm exhibiting boron toxicity symptoms.
Photo by Lawrence Costello, UCCE San Francisco-San Mateo.