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## IF-9 Successful Gardening in Double Diamond

### Key Points

- Boron vs. soluble salts and sodium
- Soil conditioning
- Raised beds
- Water management
- Plant selection

### Boron vs. Soluble Salts and Sodium

Some of the most difficult growing conditions imaginable are found in the Double Diamond area. These conditions exist along the east side of the Truckee Meadows south of the Double Diamond area and extend north through the Spanish Springs area. The causes of these adverse conditions include restricted drainage and often a high water table carrying dissolved salts and boron.

Soil tests indicate toxic levels of soluble salts and boron exist throughout the area. However, the REAL problem is the presence of sodium which compounds existing drainage problems. Boron and salts can be leached out IF drainage can be improved. Soils are very fine, similar to talcum powder, thus water moves very slowly through these soils, if at all. Water ponding and runoff occur in a very short time, often as soon as five minutes after irrigation has begun.

### Soil Conditioning

The first step is a soil test to determine levels of boron, soluble salts and sodium. The next step is to improve the drainage and maybe even install drainage pipes. The new homeowner needs to increase drainage as deep as possible and replace the sodium that is tied to the soil. The other soluble salts and boron can be leached downward. This may not be as easy as it sounds as drainage is restricted for several feet down and is also affected by a high water table. As this water table rises during a wet spring, salts, including sodium, are re-deposited at the surface when the water table recedes. During wet springs the salts will rise through any new topsoil that has been used, contaminating it as well.

Depending upon the soil test and sodium results, the reclamation may be started by the addition of 50 to 100 pounds of gypsum per 1000 sq. feet. The gypsum should be worked into the soil as deeply as possible, 6"-8" minimum. This will help release the sodium from the soil particles so they can be leached downward. Gypsum needs to be added to the lawn area especially, as once the lawn is in you will not be able to effectively condition the soil again. Ideally, gypsum should be added and tilled in BEFORE adding any topsoil. Add half of the topsoil needed, 1 ½"- 2" of organic matter and rototill again. Some artificial drainage using perforated pipe at this time is strongly recommended. Establish the rough grade and add the final half of the topsoil. Do not rototill this last time. This blending of gypsum, organic material and topsoil will help prevent the creation of any interfaces or abrupt texture changes and allow water to infiltrate into the lower profiles more easily and rapidly. This will also encourage deeper turf rooting. Use gypsum and organic material wherever you intend to plant, ideally over the entire yard or shrub/tree bed.

The next step is proper planting. This is a very critical factor. Prepare the planting hole as wide as you have energy for but a minimum of 3 times the diameter of the root ball --5 times would be better (Fig. 1). The root ball should be only deep enough to enable the root ball to sit on firm, undisturbed soil.

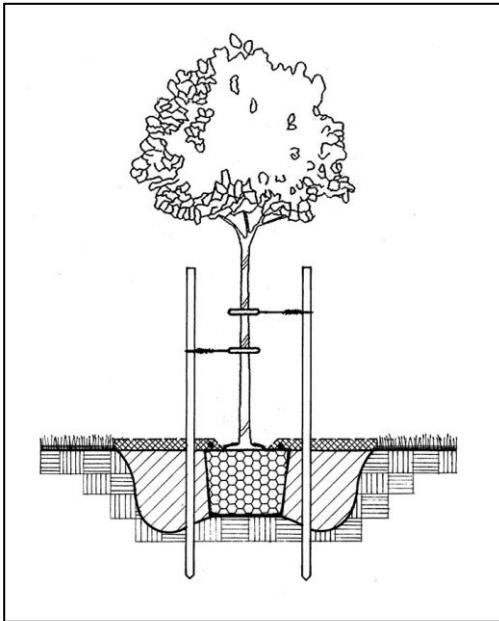
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This depth should place the root ball at the same depth as it was before or even up to one inch higher. It is highly recommended that the outer, bottom edge of the hole be dug 6"-8" deeper and sloped upward toward the center plateau (Fig. 1). Soil removed from the hole should be conditioned with equal parts of soil, organic matter and gypsum. Use your shovel for a measuring tool. Mix very thoroughly and backfill in the hole, and water when the hole is  $\frac{3}{4}$  full. Do not place rock or gravel in the bottom of the hole to "aid drainage." Water simply will perch or sit on the rock-soil interface. For perennials, ground covers, flower beds and vegetable gardens, rototill 50-100 pounds of gypsum per 1000 sq. feet as well as 4"-6" of organic matter into the soil 6"-8" deep and over the entire area. You may also consider using raised beds for some planting.

#### **Raised Beds**

You may consider raised beds for planting. They allow plants to develop in good topsoil or triple mix soil above the native Double Diamond soil. Beds may be constructed of wood, rock, brick or keystone blocks and should be a minimum of 18" high. Put a cap on top for extra seating.

#### **Water Management**

Soil conditioning is the key for plant survival but proper watering is also vital. Keep in mind at all times DRAINAGE IS RESTRICTED. Water will move very slowly through the soil and watering too much, too fast, is a common cause of ponding, runoff, waterlogged soil and drowned plants.

In turf areas, apply water slowly and for short periods of time, usually 5 minutes or less. Stop watering and wait until all the stations on the controller have cycled for about 30 minutes minimum and rewater. Do this several times on your watering days until moisture has reached 6"-8" deep. Check your soils with a trowel or shovel before and after you water to see how deep the water has infiltrated and what is remaining from the previous irrigation. It would probably be best to record the times for future controller settings. Remember that most sprinklers and sprinkler systems apply water much faster than the soil can absorb it, especially spray nozzles.

Drip irrigation is recommended for several reasons but must be monitored as well to avoid salt accumulations around the high points of berms, etc. A monthly overhead watering with a hose and sprinkler over the entire planting area is recommended to leach the accumulated salts down.

#### **Plant Selection**

Plant selection is another key to the puzzle of successful gardening. Plants that are salt tolerant and drought resistant should be used. The plants on the following list are generally recommended for planting in Double Diamond area. There may be some on the list that won't grow in your specific microclimate and some, not listed, that will grow. The list is intended as a guide only. The trees only are listed in order of most tolerant to least.

#### **Trees**

Idaho Locust  
Flowering Crabapple  
Purple-leaf Plum  
Thornless Honeylocust  
Raywood Ash  
Bradford Pear  
Common Hackberry  
Bur Oak  
Goldenrain Tree

*Robinia ambigua* 'Idahoensis'  
*Malus* species  
*Prunus cerasifera* 'Atropurpurea'  
*Gleditsia triacanthos*  
*Fraxinus angustifolia* 'Raywood'  
*Pyrus calleryana*  
*Celtus occidentalis*  
*Quercus macrocarpa*  
*Koelreuteria paniculata*



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Amur Maple  
Trident Maple  
English Oak (pyramidal)  
Blue Ash  
Norway Maple  
Sycamore  
European Hornbeam  
Hawthorne

*Acer tataricum* 'Ginnala'  
*Acer buergeranum*  
*Quercus robur fastigiata*  
*Fraxinus quadrangulata*  
*Acer platanoides*  
*Platanus occidentalis*  
*Carpinus betulus*  
*Crataegus* species

#### Evergreen Trees

- Rocky Mountain Juniper
- Pinon Pine
- Austrian Pine
- Scotch Pine
- Arizona Cypress
- Atlas Cedar
- Incense Cedar
- Bristlecone Pine

*Juniperus scopulorum*  
*Pinus edulis*  
*Pinus nigra*  
*Pinus sylvestris*  
*Cupressus arizonica*  
*Cedrus atlantica*  
*Calocedrus decurrens*  
*Pinus aristata*

The following shrubs and perennials need water in order to properly get established, followed by less irrigation as they mature.

#### Shrubs

- Peashrubs
- Flowering Quince
- Butterfly Bush
- Smoke Tree
- Cotoneasters (all)
- Scotch Broom (all)
- Silverberry
- Burning Bush
- Juniper (most varieties)
- Beauty Bush
- Privet (all)
- Mock Orange
- Mugo Pine
- Arborvitae
- Potentilla
- Pyracantha
- Sumac
- Arctic Willow

*Caragana arborescens*  
*Chaenomeles* species  
*Buddleia* species  
*Cotinus coggygria*  
*Cotoneaster* species  
*Cytisus scoparius*  
*Elaeagnus commutata*  
*Euonymus alatus* 'Compacta'  
*Juniperus* species  
*Kolkwitzia amabilis*  
*Ligustrum* species  
*Philadelphus coronarius* x *virginalis*  
*Pinus mugo*  
*Thuja* species  
*Potentilla fruticosa*  
*Pyracantha coccinea*  
*Rhus* species  
*Salix purpurea*

#### Perennials and Ground Covers

- Apache Plume
- Yarrow
- Basket of Gold
- Rock Cress
- Sea Pink
- Snow-in-Summer
- Mock Strawberry

*Fallugia paradoxa*  
*Achillea millefolium*  
*Aurinia saxatilis*  
*Arabis* species  
*Armeria maritima*  
*Cerastium tomentosum*  
*Fragaria* species

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- Lambs Ear
- Mother of Thyme
- Veronica
- Ajuga (some)
- Periwinkle
- Kinnickinick
- Horizontal Cotoneaster (all)
- Genista
- Halls Honeysuckle
- Mahonia Creeping
- Bishop's Weed (dense shade)
- Daylilies
- Gaura
- Ornamental grasses

*Stachys byzantina*  
*Thymus serpyllum*  
*Veronica* species  
*Ajuga* species  
*Vinca* species  
*Arctostaphylos uva-ursi*  
*Cotoneaster* species  
*Genista lydia*  
*Lonicera halliana*  
*Mahonia repens*  
*Aegopodium podagraria*  
*Hemerocallis* species  
*Gaura lindheimeri*  
Various species

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