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 redeposited 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. ft. 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 tilted 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 a 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.
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 ¾ 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 (Robinia ambigua ‘Idahoensis’)
- Flowering Crabapple (Malus species)
- Purple-leaf Plum (Prunus cerasifera ‘Atropurpurea’)
- Thornless Honeylocust (Gleditsia triacanthos)
- Raywood Ash (Fraxinus angustifolia ‘Raywood’)
- Bradford Pear (Pyrus calleryana)
## Evergreen Trees

- Rocky Mountain Juniper: *Juniperus scopulorum*
- Pinon Pine: *Pinus edulis*
- Austrian Pine: *Pinus nigra*
- Scotch Pine: *Pinus sylvestris*
- Arizona Cypress: *Cupressus arizonica*
- Atlas Cedar: *Cedrus atlantica*
- Incense Cedar: *Calocedrus decurrens*
- Bristlecone Pine: *Pinus aristata*

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

## Shrubs

- Peashrubs: *Caragana arborescens*
- Flowering Quince: *Chaenomeles species*
- Butterfly Bush: *Buddleia species*
- Smoke Tree: *Cotinus coggygria*
- Cotoneasters (all): *Cotoneaster species*
- Scotch Broom (all): *Cytisus scoparius*
- Silverberry: *Elaeagnus commutata*
- Burning Bush: *Euonymus alatus ‘Compacta’*
- Juniper (most varieties): *Juniperus species*
- Beauty Bush: *Kolkwitzia amabilis*
- Privet (all): *Ligustrum species*
- Mock Orange: *Philadelphus coronarius x virginalis*
- Mugo Pine: *Pinus mugo*
- Arborvitae: *Thuja species*
- Potentilla: *Potentilla fruticosa*
- Pyracantha: *Pyracantha coccinea*
- Sumac: *Rhus species*
- Arctic Willow: *Salix purpurea*

## Perennials and Ground Covers

- Apache Plume: *Fallugia paradoxa*
- Yarrow: *Achillea millefolium*
- Basket of Gold: *Aurinia saxatilis*
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<tr>
<td>Rock Cress</td>
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<td>Sea Pink</td>
<td>Armeria maritima</td>
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<td>Snow-in-Summer</td>
<td>Cerastium tomentosum</td>
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<td>Mock Strawberry</td>
<td>Fragaria species</td>
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<td>Lambs Ear</td>
<td>Stachys byzantina</td>
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<td>Mother of Thyme</td>
<td>Thymus serpyllum</td>
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<td>Veronica</td>
<td>Veronica species</td>
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<td>Ajuga (some)</td>
<td>Ajuga species</td>
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<td>Periwinkle</td>
<td>Vinca species</td>
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<td>Kinnickinick</td>
<td>Arctostaphylos uva-ursi</td>
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<td>Horizontal Cotoneaster (all)</td>
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<td>Genista</td>
<td>Genista lydia</td>
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<td>Halls Honeysuckle</td>
<td>Lonicera halliana</td>
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<td>Mahonia Creeping</td>
<td>Mahonia repens</td>
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<td>Bishop’s Weed (dense shade)</td>
<td>Aegopodium podagraria</td>
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<td>Daylilies</td>
<td>Hemerocallis species</td>
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<td>Gaura</td>
<td>Gaura lindheimeri</td>
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<tr>
<td>Ornamental grasses</td>
<td>Various species</td>
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