



Gardening strategies for short-season, high-altitude zones

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INTRODUCTION

Living in a harsh climate doesn't necessarily relegate you to frustration and failure in landscaping and gardening. However, success will require that you work with, rather than fight, the local environment. Consider plant selection, plant placement, management procedures that hasten maturity, season-extending techniques, and winter protection.

PLANT SELECTION

The single most important tool you have to ensure successful short-season gardening is your selection of appropriate plant species and varieties. The right plant, placed in the correct location, will not only survive, it will thrive. It will also take less work to keep that plant healthy and productive.

Generally, plants that do well in Idaho's harsh climates can withstand light spring and fall frost, are rated for USDA zone 4 or lower (zone 3 in the coldest areas), and complete their life cycle within a 60- to 110-day growing season. Suggestions for selecting appropriate species and varieties of vegetables, ornamentals, and fruit crops appear in other publications in the Short-Season, High-Altitude Gardening series.



YOU ARE A SHORT-SEASON, HIGH-ALTITUDE GARDENER IF:

- You live in Idaho at an elevation above 4,500 feet, **OR**
- Your USDA hardiness zone is 4 or lower, **OR**
- You have a frost-free growing season of 110 days or less



Many perennial penstemons are hardy in Idaho's harsh climates.



Annuals, vegetables, and herbs—Because annuals grow for only one summer, the most important consideration when purchasing plants is the number of days required to reach bloom or fruit maturity. Also, choosing plants that can withstand some frost will help extend the season.

Perennials—Perennials, by nature, live through the winter and regrow in the spring. For this reason, choosing winter-hardy plants is the most important consideration. Perennials are relative easy to replace in the landscape, and, consequently, it is simple to experiment with plants that are only marginally hardy.

Trees, shrubs, and woody vines—Woody plants are difficult to protect; consequently, they must be able to withstand severe winter weather conditions. They are also long-lived and difficult to replace in the landscape. For these reasons, your initial choice of woody plant materials is critical.

If you plant fruit trees or small fruits, recognize that different varieties vary widely in hardiness, and that your choice of varieties is as important as your choice of species. Tree fruit varieties should be early maturing but also late blooming to lessen the risk of blossom damage during a late-spring frost.

Choosing a hardy species, without consideration for variety, is usually adequate for most shade trees and shrubs. However, some shrubs (such as roses) vary widely in variety hardiness.



South- or west-facing structures such as a wooden fence (above) or home foundation (below left) create warm microclimates that improve winter survival of tender perennials and shrubs, allow them to grow and bloom quicker, and extend the growing season by providing frost protection for flowers and vegetables in spring and fall.

SITE SELECTION

Some plants can grow over a wide range of conditions. Others need a suitable microclimate such as shade, protection from prevailing winds, or a warm spot. Shady areas in most yards are on the north side of buildings or under taller trees and shrubs. Wind barriers can be either structures or other plants.

Microclimates that provide the greatest benefits in Idaho's harsh climates are usually those that provide extra warmth. Enclosures formed by buildings or solid fences create the warm spots in most yards. Masonry structures with a southern exposure can be especially effective at holding and reflecting warmth from the sun. Flowers and vegetables planted within a few feet of them will often flower or mature several weeks earlier than plants in the open. These locations may also provide five or more degrees of frost protection.

Southern exposures next to buildings are good places for marginally adapted herbaceous perennials that might not survive winter in a more open spot. Situated next to a warm foundation, the roots and crowns of these plants will warm during sunny days, resulting in better conditions for survival. Woody and evergreen plants may not do as well in a southern exposure because wildly fluctuating air temperatures disrupt their cold acclimation processes and dry out woody tissue.

Use of raised planting beds is another effective technique in harsh climates. A raised bed will warm faster in the spring and get the plants off to a quick start. This is particularly important for vegetables and annual flowers, but may also speed the flowering of perennials or small shrubs.

Planting tender plants on slopes may extend your growing season by up to 2 weeks in both spring and fall. Cold air drains down slopes and collects in low spots. As a result, depressions experience killing freezes far sooner than slopes.

MANAGING GROWTH RATE AND MATURITY

In short-season climates, it is critical that plants get off to a quick start in the spring, complete their life cycle quickly, and become acclimatized for winter survival. Some gardening techniques encourage these plant responses, including transplanting and properly managing fertility and irrigation.

TRANSPLANTING

If you start plants indoors in a protected place, they will complete a portion of their life cycle while it is still too cold and damp for them outdoors. When it warms up enough to plant them outdoors, they will have the advantage of continued rapid growth and go on to grow and bloom during the best growing conditions of the short summer. Transplanting speeds bloom and/or harvest of annual flowers and vegetables.

Transplanting can also help many perennials by minimizing chances for early season frost injury. Transplanting perennials also helps them grow larger during the first season, an important factor for winter survival. Transplanted perennials of some species may also bloom the first year after planting when they would otherwise not bloom until the second year.

In many cases, you can find healthy transplants at local nurseries. Purchasing ready-to-plant seedlings is the simplest (but most expensive) method for getting a fast start.

Unfortunately, some nurseries and virtually all mass merchandizing stores grow and sell a standard set of plant materials that may not be adapted to our short-season environments. If this is the case in your area, do a little research in seed catalogs, purchase seed of many adapted species and varieties, and produce your own transplants. Although this takes more work and requires bright indoor lighting, it brings its own personal rewards.

MANAGING FERTILITY

Some advertising may lead you to believe that high amounts of fertilizers in frequent applications will make plants grow faster, produce more, and look better in a short-season climate. In reality, the opposite is true. High amounts of fertilizers, especially those with a high proportion of nitrogen (N), force plants to grow lots of foliage, delay flowering and fruit set, and keep the plant immature. A delay in maturity has a critical impact on perennials and woody plants: it delays winter acclimatization, making the plants more susceptible to winter injury.

Here are some tips for managing fertilizer to control plant maturity in short-season climates. These recommendations are valid whether you prefer to use organic or inorganic fertilizer sources:

Don't overfertilize—Use the minimum amount of fertilizer needed to maintain plant health. In comparison with gardens in long-season environments, fertilizer applications in short-season, high-altitude gardens can be reduced by one-third to one-half. Suggestions for fertilizer application rates can be found in publications of the Short-Season, High-Altitude Gardening series specific to each category of plant.

Use low-nitrogen, high-phosphorus formulations—Use fertilizer formulations that are relatively low in nitrogen (N) and high in phosphorus (P). Phosphorus can actually help compress a plant's life cycle. Examples of appropriate formulations (listed as N-P-K on the label) include 16-20-0, 8-10-8, 6-10-4, or 4-10-4. Notice that appropriate fertilizers have a high middle (P) number. If you cannot find a high P fertilizer, purchase a second fertilizer that is mostly phosphorus and mix your own.

Time your applications—Apply fertilizers at optimal times in the growing cycle. The best time to fertilize herbaceous annual plants is early spring. The ideal time for grasses, perennials, and woody plants is in late fall after they go dormant (after deciduous trees lose their leaves but before ground freeze). In order to improve hardiness, fertilizer should never be applied to woody plants between late July and mid-September.

MANAGING IRRIGATION

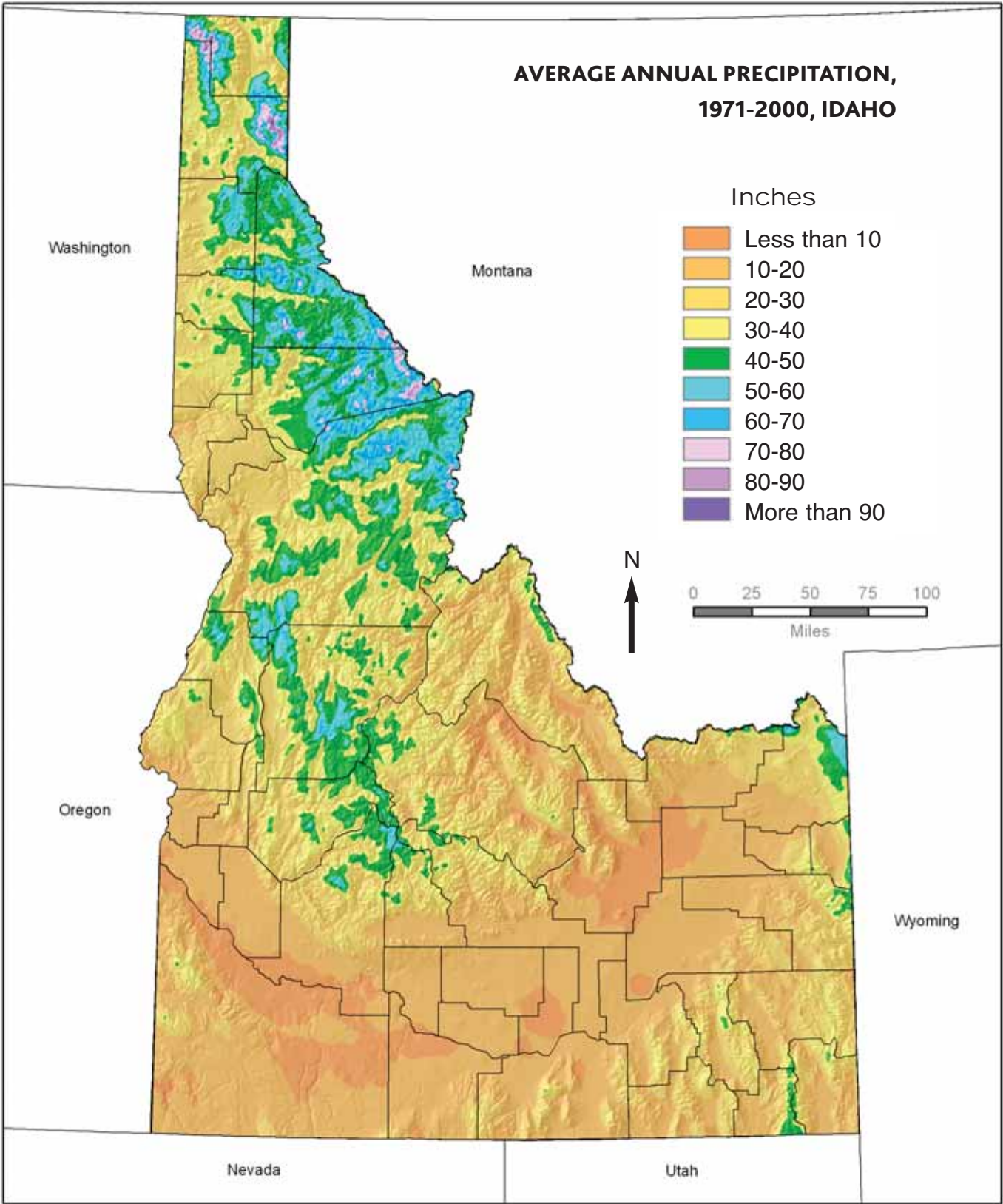
Natural precipitation varies widely among geographic regions in Idaho, making the need for irrigation variable as well. Insufficient water during spring and summer slows plant development and delays maturity. On the other hand, cutting back on water late in the fall can help plants acclimate for winter. Here are a few suggestions for managing water in short-season climates.

Prevent drought stress—Design and operate irrigation systems to prevent drought stress. In mid-summer in the desert climates, you may need to irrigate more than once a week. In cooler and high-altitude climates, you may need to irrigate only occasionally to supplement rainfall or maybe more frequently in dry years.

Irrigate plants to meet their water needs for optimal growth. If you are not sure how much water they need, obtain a good publication that provides detail on plant water use and irrigation scheduling in your region. Taking the time to understand the principles and practices of correct watering will pay huge dividends. Remember that some native or desert plants require (and prefer) much less water than traditional landscape plants.



Good irrigation practices optimize plant growth and survival in harsh climates.



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Prepare plants for fall—If you have newly planted perennials, shrubs, or trees in your yard, it is best to maintain good soil moisture up until snowfall in order to help get a good root system established. However, if you have a mature landscape, a short period of drier conditions in the fall will help the plants get ready for the winter. Cease irrigating woody plants and perennials around the end of August to the middle of September. After they have gone dormant (usually early to mid-October), provide one last, deep (to a depth of 2 to 3 feet) irrigation to help minimize winter damage that may result from dehydration.

Sometimes, it's hard to determine how much water makes for a good soaking. In most soils, it will take spray-type shrub heads about 3 to 4 hours to put down enough water to soak in to 3 feet. You will need to run rotor and rainbird-type sprinklers about three times that long.

USING SEASON EXTENDERS

In short-season, high-altitude environments, you can count on many plants needing routine protection from spring, fall, and the occasional summer frosts. If uninjured by an untimely cold snap, plants will continue growing during the warm weather and good growing conditions that exist before the last spring frost and long after the first frost in the fall. This is especially true in drier climates where day-night temperature swings can be incredibly large.

Season extenders will get plants through untimely frosts. "Season extender" is a broad term for many techniques and products. Some season extenders have the additional advantage of accelerating growth by holding warmth around plants during cool spring weather. Some extender techniques work best for spring protection, others for fall, and some work at both ends of the season.



Greenhouses are available in a wide range of sizes and price ranges and are the ultimate in protection from cold weather.

The season-extender techniques described here are only a sample of what is possible. Only our imaginations limit the possibilities. Any structure or gizmo that puts a layer of material between the plant and the outside air will help hold heat and protect from frost. As you create your own protective devices, remember that clear materials like plastic provide less protection than solid materials. However, clear materials have the advantage that you can leave them in place during the day.

SEASON EXTENDERS FOR BOTH FALL AND SPRING

Greenhouses—Glass, plastic, or fiberglass structures are the ultimate in season extenders. They come in myriad sizes and shapes—some commercially constructed, others home-built. Greenhouses allow you to grow many tender plants that are otherwise off-limits in Idaho's short-season climates. Even an unheated greenhouse can allow you to enjoy tomatoes, cucumbers, and flowers long after the outside season has ended. Heated greenhouses can help you extend the season through the winter, although you may not wish to maintain plants in the coldest months due to the high cost of heating. If you wish to grow plants in the greenhouse during the summer, some method of cooling (opening walls or roofs may be enough) will be needed.

Tunnels or row-covers—A simple way to protect entire rows of plants such as vegetables is to use fabric row covers. These are long pieces of fabric laid over hoops or directly over plants to make a tunnel. They are especially effective if used simultaneously with black plastic mulch. Tunnels not only protect plants from frost but provide warmth and protection all summer.

Summer-long use may require some protection from strong winds that can damage the fabric. On the warmest summer days, you may need to open the tunnels along one side to release excess heat. Like greenhouses, row covers allow you to produce tender plants that are otherwise not adapted to your climate.

Heaters—You can use electric, charcoal, propane, or oil heaters to prevent frost injury in limited areas of your yards. They are especially effective in helping ward off spring injury to blossoms on fruit trees, but can also be used effectively to protect blooming and fruiting plants in the fall. Combined with tarps or blankets, they can be especially effective, even in cases of severe cold.

Sprinkler irrigation—Applying water to plants using overhead sprinklers can protect them from temperatures as low as 27°F. As strange as it may seem, the ice-coated plants will not freeze. The reason is that water gives off heat in the process of turning to ice.

To use this method effectively, you must turn on the sprinklers before the temperature gets below freezing and keep them on until the ice has completely melted the next morning. You may not be able to use this technique when freezing temperatures fall on several consecutive nights because the soil will get saturated and damage the plant roots.



Applying water with sprinklers causes ice to deposit on plants and protects them and even their blossoms from frost.



Plastic milk jugs with the bottom cut out make great frost protection devices for small plants..



Water-filled milk jugs placed on the north side of small plants provides excellent frost protection without actually covering the plant.

SEASON EXTENDERS FOR SPRING

Some techniques work only in the spring when plants are small.

Old-fashioned hot caps—These trap residual heat from the soil and protect seedlings and plants from mild frost events. Using a similar technique, you can protect very small plants with paper or foam cups.

Water cube covers—Sold in most nurseries, this product (for example, Wall O' Water) consists of a bi-layered plastic sleeve that slips over plants. Pockets in the sleeve wall are filled with water, which cools slower than the surrounding air and protects the plants from freezing temperatures. Water tubes also trap heat on sunny days and increase the early growth of plants. Many people like to leave them in place until plants outgrow them.

Milk jugs—Larger plants can be protected with gallon-sized plastic milk jugs. Cut out the bottom and slip them over the plants. They can be left in place for several weeks to collect heat and speed plant growth. Intact milk jugs can also be filled with water and placed next to and on the north side of small plants. The water collects heat during the day and radiates the heat back to the plant at night. Combining the two techniques—a milk jug cover and a water reservoir—can provide a high level of protection.

Used tires—If you don't mind a few old tires lying around the garden, you can use them to very effectively protect your plants. Place a tire on the ground with the plant in the center. The black rubber will heat the surrounding air and soil during

the day. The residual heat will provide some frost protection at night. Additional protection can be had by stretching plastic wrap over the top of the tire. During the day, the tire and plastic wrap create a very warm microclimate that results in rapid early growth. The plastic wrap should be partially removed on warm days to prevent heat injury.

Be careful not to allow tires to trap water in the walls and become a prime breeding site for mosquitoes. Drilling several large holes in the down-facing sidewall of the tire will let water drain out.



Used tires placed around plants provide excellent frost protection and are even more effective if covered with clear plastic.

SEASON EXTENDERS FOR FALL

Protecting plants in the fall is more difficult than in the spring, mainly because the plants are so much bigger. There is only one common method we can count on, that being to cover tender vegetation.

You can provide very effective frost protection by covering plants overnight with blankets, tarps, or frost cloths. This technique has limitations because it leaves plants in the dark, and the cover must be removed during the daylight hours if continued growth is desired.

WINTER PROTECTION

Most perennials and woody plants have inherent characteristics that determine the minimum temperatures they can withstand before experiencing irreparable winter damage. This is the basis for hardiness ratings. Many marginally hardy plants may need some form of protection to survive winters in Idaho's short-season, high-altitude regions. Large shrubs or trees will need to be selected based on hardiness in zone 3 or lower (zone 4 in warmer areas) because it is not practical to protect them. However, with a little work, you can keep perennials and small-statured shrubs alive and healthy, even if they are marginally adapted. Winter protection usually involves some form of covering to avoid temperature extremes and prevent drying.

PERENNIALS

Most herbaceous perennials die back to the ground each fall, so protecting them is relatively simple. Start by clipping the dead foliage down to a height of 1 to 2 inches (except ornamental grasses, which should be left unclipped through the winter) then cover the stubs with 3 to 8 inches of mulch.

Good mulches include wood chips, pine needles, sawdust, straw, or other dry plant material. Straw may not be the best choice if you have mice or voles living nearby. They will nest in the straw and feed on the crowns and roots of your perennial plants. Avoid using leaves for mulch; they tend to pack down and seal the soil surface. In areas where large amounts of snow come early and remain winter long, you may get adequate protection by shoveling 8 to 12 inches of snow onto tender perennials before significant cold weather occurs.

SMALL SHRUBS

Woody plants have living tissue aboveground throughout the winter. Even when protected, tender shrubs may sustain some damage. Consequently, plan to prune judiciously each spring to remove damaged branches. Only tender shrubs that can withstand this process of pruning and regrowth should be considered for planting in short-season, high altitude regions.

You can use snow or mulches to protect small shrubs from winter injury. The protective layer will need to be deep and mounded over the plant. If you mulch with straw or leaves, mice and voles may move in and feed on the tender bark. You



Tarps and frost cloths provide excellent protection for tomatoes and other tender plants in both spring and fall.



Mounding soil or organic matter around the bases of roses and other shrubs is an excellent way to prevent winterkill.

can exclude these small mammals by installing a mesh-wire barrier around the plant. Fill the barrier with mulching material to increase cold protection.

Styrofoam cones or boxes, purchased or homemade, also are effective plant coverings. Woven plastic materials (not film, which doesn't allow plants to breath) such as groundcover cloth can be wrapped around shrubs, followed by one or more layers of burlap.

There is a tradeoff in using winter protection materials: they will not add beauty to the winter landscape. Maintaining winter interest in our landscapes is important in short-season-high-altitude regions. After all, in some places winter takes up half of each year.

Protective materials can be detrimental to plants if left in place for too long into the spring. They result in early growth of weak, yellow sprouts that are easily damaged by frost or wind once the protective material is removed. Remove protective materials after the severe cold of winter is past and just before the first warm days of spring.

Before planting tender shrubs, give careful thought to the consequences. Realize that protecting tender woody plants from the ravages of winter is hard, time-consuming work. If you are addicted to hybrid tea roses, hibiscus, hydrangeas, or other pretty plants that are not adapted to our climate, recognize that one or two plants is a manageable project. Many plants or a hedge will lead to disaster, or at least disappointment. The best choice, ultimately, is to carefully select plants that can withstand the harsh Idaho climates with no more than a 4-inch layer of mulch and a minimum of additional pampering.

CONTAINER GARDENING

You may want to consider using container plantings to extend the growing season and accent the landscape, add color, and grow edible plants. Container gardens can be especially effective for growing tender, unadapted flowers and vegetables.

Containers can be moved and placed to take advantage of appropriate light and temperature conditions. You can move them indoors during inclement weather. You can also provide winter protection by storing containers holding perennial or woody plants in a cool, dark place. There are many good books, web sites, and other publications that provide excellent information on container gardening techniques.

Many terra-cotta or other ceramic containers need extra care in our cool-season climates. They are often damaged by frost and cold winter weather, especially if filled with damp soil. To protect the pots, elevate them with "feet" so the base does not trap moisture. The best way to keep ceramic pots attractive is to empty them, allow them to dry, and store them inside for the winter.



Container gardening is an excellent way to extend the growing season and provide accent at key points in the landscape. Photograph courtesy of FreeFoto.com.

Find more gardening resources and publications online at extension.uidaho.edu/homegard.asp



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