



University of California Cooperative Extension

Backyard Gardener

INYO AND MONO COUNTIES

SPRING 2009

207 W. SOUTH ST.
BISHOP, CALIFORNIA 93514

OFFICE (760) 873-7854
FAX (760) 873-7314

Solarize to Control Garden Soil Pests with Help from the Sun

Compiled by Yvonne Wood

Instead of using chemicals to control soilborne pests, consider using free heat from the sun to 'bake' them. While this method requires giving up your garden plot for a month or two during June and July, it offers long-term control of soil pests. Solarization should work great for those living in the sunny desert areas of Inyo County who are willing to delay planting directly into their garden soil until mid-July to August. However, some residents of Mono County may not have a long enough growing season to both solarize their soil and plant slower-growing produce. Four to six weeks of summer sun are needed to carry out this process.

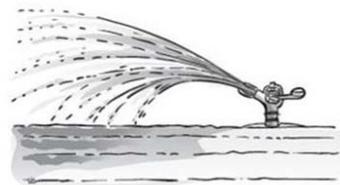
Using the following procedures, the top six inches of your future garden's soil can be heated to 140° F -- hot enough to kill problematic pests, such as weed seeds and seedlings, nematodes, insects, and pathogens. Transparent polyethylene plastic is placed on moist soil during hot summer months to increase soil temperatures to 'lethal' levels. In addition to keeping chemical residues out of your soil, this process should help boost garden growth. Solarization increases availability of soluble soil nutrients such as nitrogen and potassium to your seedlings. Additionally, the survival and activation of beneficial organisms appear to play an important role in the increased plant growth commonly observed in solarized soils.

How to proceed: Follow these four steps to solarize your soil: (1) cultivate and remove plant matter; (2) level and smooth the soil; (3) irrigate; and (4) lay a clear tarp on the soil surface for 4 to 8 weeks, depending on local conditions.



1. Cultivate the soil

2. Level the soil



3. Irrigate

4. Lay the tarp

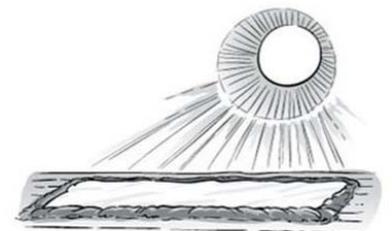


Illustration by W. Suckow

Additional How-To's

Utilize the hottest weeks of the year -- for our region these are usually in July and the best time to solarize should be June and July.

Solarization is best on areas of your garden with little or no slope. If there is slope, use slope which has south or southwest exposure.

Protect your plastic tarp -- which should be clear, not black -- from wind damage. In our windy areas, polyethylene plastic should be at least 1.5 to 2 mils thick. Additionally, wind can disperse the heat trapped beneath the tarp if it is allowed to loosen the edges.

Shade reduces effectiveness.

Before laying the plastic tarp on top of the soil, be sure that your garden bed is raked smoothed, since clods and litter prevent the tarp from lying snugly against the soil surface.

Don't disturb the soil much (ie forming raised beds or furrows) after this process.

Water conducts heat better than air, so wet your soil to at least a depth of 12 inches at you begin this process. It is best to wet the soil prior to applying the plastic, but if necessary you can run a hose under the plastic tarp to wet the soil.

Try not to wet the soil again during this process unless the soil dries out.

Answers to some common questions:

Can I leave the plastic on the soil too long?

Yes, if 1 mil transparent polyethylene plastic without UV inhibitor is left on the soil longer than 6 to 7 weeks during summer it becomes brittle and begins to tear. Brittle plastic is difficult to remove from the soil. This problem may be overcome by using plastic containing ultra violet inhibitors; such plastic, however, is usually only available when large quantities are specially ordered.

Can soil solarization be used in cooler areas such as those near the coast?

Soil solarization may be partially effective in cooler coastal and high elevation areas if treatment occurs during periods of highest air temperatures and when skies are clear. However, pest control may not extend as deeply into the soil as in areas of higher

temperatures, and some organisms may not be controlled.

Does soil solarization kill beneficial soil organisms?

Populations of some beneficial organisms, such as *Trichoderma* spp. or actinomycetes, may be increased by solarization. Other important soilborne organisms, such as mycorrhizal fungi, may be decreased in the upper soil profile but not enough to lessen their beneficial action. Populations of some microorganisms, such as beneficial bacteria (*Bacillus* and *Pseudomonas* spp.) are partially decreased during solarization but afterwards recolonize the soil rapidly. However, populations of *Rhizobium* spp. of bacteria, which fix nitrogen in root nodules, are killed and must be reintroduced with seeds of legume crops.

Can soil solarization be combined with chemical control?

Yes, preliminary experiments combining solarization with low application rates of fungicides, fumigants, or herbicides have led to improved control of pathogens, nematodes, and weeds. Solarization chemical combinations may be especially useful in cooler areas, for heat-tolerant organisms, or to increase the long-term benefits of solarization.

You can also solarize soil in pots and other containers! To see how to disinfest small amounts of moist, containerized soil and for more information on solarization in general, see the following reference: Soil Solarization for Gardens & Landscapes. University of California Agriculture and Natural Resources Publication 74145, October 2008. Available for download in a pdf format at <http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn74145.html>. Or, you can pick up a copy at our local UCCE office in Bishop.

More in-depth discussion can be found in another UCCE publication, *Soil Solarization: A non-chemical method for controlling diseases and pests*. Again, available on the web at

<http://ucce.ucdavis.edu/files/filelibrary/40/942.pdf>, or in our local UCCE office.



The Garden at Hans Resort

By Yvonne Wood

Each spring and summer, a beautiful flower garden covers the grounds of Hans Resort -- located at the intersection of Juniper Drive and Crowley Lake Drive -- in the town of Crowley Lake. Over the years, Hans Resort owner Kathy Shibley has been able to draw oohs and aahs from visitors to her garden by utilizing some simple planting procedures. For instance, her garden begins blooming early -- soon after the season's snow melts -- due to self-seeding annuals from the previous year's plantings. She then supplements these early bloomers by planting seedlings as well as broadcasting wildflower seeds by hand.

Kathy's garden is planted in hillside soils formed in rocky glacial till. Gardeners in the high desert mountain regions of Mono County know how challenging these sandy and gravelly soils can be due to their rapid drainage and low fertility. Kathy has come up with a method of planting that maintains the natural look of the hillside, while producing a lot of color.

First, she leaves some of the native shrubs intact to form permanent landscape elements as backdrops to her blooming perennials and annuals. Then, rather than removing the rocks from her mountain-side garden to form a stone free soil, Kathy only removes selected shrubs leaving pockets of untilled soil within natural rocky depressions. This method allows her plantings to access the accumulation of nutrients left behind by natural processes associated with native shrub growth. Desert -- including high elevation desert -- topsoils are known to contain relatively high concentrations of plant available nitrogen and phosphorus and are generally quite productive for the first couple of years if left untilled.

So by using this low impact method of clearing her land, Kathy's flower garden soils initially have plenty of nutrients. However, desert soils are generally low in carbon. Soil carbon is very important in our dry climates because it helps retain soil water. When Kathy first cultivates an area



of her hillside, she brings in bags and bags of organic compost to lay atop the soil. Then, Kathy continues to maintain carbon in her soils by ample additions of mulch when



she puts her gardens to bed in fall and as they wake up in spring. Her fall mulch consists of the vegetation from that season's flowering plants -- which she weed-eats and leaves covering the soil prior to first snow. Her spring treatment consists of mulch bark (atop broadcast granulated forms of herbicide and fertilizer) -- added when she plants her seedlings. While helping add important water retaining soil carbon, these mulches also provide natural sources of other nutrients. And, they 'put a lid' on the evaporation of valuable applied water during the growing season.

Kathy waters her garden daily by hand throughout the growing season. However, not all of us can do so. For instance water is often rationed in Mammoth Lakes during the summer. For those of us who have limited available water, it is essential to pay attention to methods of application. Best is drip irrigation into a soil which is adequately mulched. Using this method, minimal water is lost to evaporation, and the mulch helps retain soil moisture while keeping soil temperatures as low as possible. Drip irrigation applies water directly to the root zone, where the plant acquires its water. It also reduces overspray and evaporation. It can be automatically timed to deliver water less frequently, but at an adequate rate to provide a deep watering which is essential for healthy plants.

One problem with drip irrigation in arid climates can be the accumulation of salts near the root zone. However, this problem should be minimal in sandy, rapidly leaching glacial till soils during those years when we have a sufficient amount of winter rain and snowmelt. However, in drought years, you may need to rely primarily on xeric flowering species to form a color-filled garden. Species adapted to xeric (dry) conditions -- including many natives -- can go further on less water as well as withstand higher levels of soil salts than imports to our challenging climate zones.



Since we usually don't know when we are going to have a dry year, it would be wise to dedicate a portion of your garden lay-out each year to landscape plants which can withstand droughty conditions. Use a selection of desert natives in amongst your plantings -- say every other depression area. Then if drought occurs you will have some plantings to carry your flower-power through the summer season.

Other water-wise ideas include arranging decorative piles -- or 'cobblestone surfaces' -- of rocks near your flower plantings. These provide 'hardscape' to direct run-off from rainwater, irrigation water, and snow melt into the soil near the root zone. Again, additions of soil carbon will help to hold the water longer in the soil. And using Kathy's separate 'rocky depressions' plantings allows for the implementation of zone irrigation, which simply means that plants with similar water requirements are grouped together.

Kathy Shibley's Favorite Bloomer:

Mountain Beebalm -- a mound-forming perennial typically seen in higher elevations of the Great Basin. It has lavender or rosepurple flowers which are attractive to insects, especially bees and butterflies. Mountain Beebalm is a member of the mint family. Its stems are sturdy and erect, and it emits a fragrant aroma of mint when brushed. This plant is easy to establish and maintain in Intermountain West landscapes and is perfect for rock gardens.



For information on other natives useful for our local gardens: visit the Utah State University Extension Native Plants link at http://extension.usu.edu/files/publications/publication/HG_Native_Plants_2009-04.pdf

Hot off the Presses — What's new on line?

Compiled by Cathy Ellis

There are hundreds of free publication on the UC ANR website that you can access to help you get started growing or answer specific questions to problems you may be having in your yard or garden. Listed below is a selected list of topics that you may be interested in:

Fruit Tree Management:

This series of handy guides for the home orchard gives a quick overview of major tasks that should be undertaken during the formant, spring bloom, summer growing and harvest, and autumn seasons.

- *Apples & Pears: Calendar of Operations for Home Gardeners #7258*
- *Apricots: Calendar of Operations for Home Gardeners #7259*
- *Cherries: Calendar of Operations for Home Gardeners #7260*
- *Peaches & Nectarines: Calendar of Operations for Home Gardeners #7261*



More Tips on Trees:

- *Fertilizing Landscape Trees - Advice on determining what nutrients your landscape tree needs and how to apply them. #8025*
- *Fruit Trees: Planting and Care of Young Trees - Learn how to plant, prune and care for bare-root or container-grown fruit trees. #8048*
- *Fruit Trees: Pruning Overgrown Deciduous Trees—How to rehabilitate that overgrown, untended fruit tree, or decide whether it's worth the effort. #8058*
- *Fruit Trees: Thinning Young Fruit - When you reduce the number of young fruit on a tree early in the season, you improve the quality of the remaining fruit at harvest time. #8047*
- *Fruit Trees: Training and Pruning Deciduous Trees - how to prune fruit and nut trees for optimum health and productivity. #8057*
- *Planting Landscape Trees - Learn the basics of planting and caring for a new landscape tree.*

In the garden:

- *Compost in a Hurry* - Simple straightforward tips to help you generate compost in as little as 2 or 3 weeks. #8037
- *Growing Seed Sprouts at Home* - How to grow edible sprouts at home for optimum health and productivity. #8057
- *Growing Tomatoes in the Home Garden* - Answers frequently asked cultural and pest management questions. #8159
- *Vegetable Garden Basics* - Essential points to consider when you are planning a vegetable garden. #8059

In the Kitchen & Food Safety:

- *Apples: Safe Methods to Store, Preserve and Enjoy* - Learn how to get the most out of the apples you buy at the market or grow in your own yard. Includes directions for preserving and freezing. #8229
- *Cantaloupe: Safe Methods to Store, Preserve and Enjoy* - Includes tips on selecting cantaloupe from your garden or grocery store, as well as storing, safe handling and preserving. #8095
- *Egg Basics for the Consumer: Packaging, Storing & Nutritional Information* - How to recognize freshness in the eggs you buy for your family. #8154.
- *Garlic: Safe Methods to Store, Preserve & Enjoy* - How to store and preserve this popular food, while avoiding common food safety problems.
- *Oranges: Safe Methods to Store, Preserve and Enjoy* - Safety tips for handling fresh oranges along with methods to freeze, dry, and can. Also includes a recipe for citrus marmalade. #8199
- *Peppers: Safe Methods to Store, Preserve & Enjoy* - This guideline includes safety tips for preserving peppers along with recommended methods for storing, freezing, drying, pickling, and canning. Includes recipes for pickled peppers, salsa, jellies and relishes. #8004
- *Safe Handling of Fruits and Vegetables* - How to keep food-poisoning bacteria out of your kitchen and off your plate. #8121
- *Safe Methods of Canning Vegetables* - A guide to methods and equipment for safe canning at home. #8072
- *Strawberries: Safe Methods to Store, Preserve and Enjoy* - Learn how to get the most out of the strawberries you buy at the market or grow in your own garden. #8256

- *Tomatoes: Safe Methods to Store, Preserve, and Enjoy* - This guide includes advice on selecting tomatoes for the home garden as well as from the market; safety tips for handling fresh tomatoes, and recommended methods for storing, freezing, drying, and canning. Also includes two salsa recipes. #8116

Lawn & Yard Maintenance:

- *Home Landscaping for Fire* - How to establish and maintain a "defensible space" around your home in areas that are susceptible to wildfire. #8228
- *Lawn Watering Guide for California* - A straightforward method to help homeowners set up timed irrigation systems for lawns anywhere in California. #8044
- *Lawns 'n' Dogs* - If you feel you have to choose between your best friend and your lawn, you are not alone. This brief guide will help you have both a green lawn and a (ahem) relieved dog! #8255
- *Managing Lawns in Shade* - Helpful tips for both homeowners and commercial landscapers. #7214
- *Managing Lawns on Heavy Soils* - Turfgrass generally does not do well on heavy, clay soils, but there are some basic steps you can take to improve its chances. #7227
- *Mowing Your Lawn and Grasscycling* - Grass clippings make up a surprisingly large portion of California's solid waste stream during the growing season. Learn how to properly mow your lawn, how to "grasscycle" the clippings, mower safety tips and more. #8006
- *Water Conservation Tips for the Home Lawn & Garden* - How to make the most of your lawn area using the least amount of irrigation water. #8036

To download or read these free publications online go to:

<http://ucanr.org/freepubs/freepubsub.cfm?cat=6>

If you do not have access to the web or need help please call the Farm Advisor's Office at 873-7854. If you call in advance we can have them ready for you when you come in to pick them up.



DO YOU LOVE TO GARDEN?

Use your passion for growing fruits and vegetables by joining **EASTERN SIERRA HARVEST** to help feed Eastern Sierra residents in need.

PLEASE JOIN US in distributing home grown produce to hungry households in **Inyo and Mono counties**.

Your Harvest will be directed to where it can really do some good by **IMACA, the Salvation Army and the Bishop Senior Center**. Your generosity will enable members of your community to serve their families the wonderful taste and healthy nutrition of fresh fruits and vegetables.



You Can Help By:

1. **Delivering the harvest** you can share to the Bishop Senior Center, The Salvation Army or IMACA distribution site located throughout Inyo and Mono counties. Just bring in any amount of whatever items you can spare;
2. **Planting an extra row for the hungry**. This spring when you sow the garden, add a couple of extra plantings dedicated to those in need;
3. **Volunteering to glean harvest** from the gardens of your neighbors who need help picking those over-producing fruit trees or keeping up with their ripening vegetables;
4. **Encouraging** friends, fellow church or community group members, business associates and others to get involved in this worthwhile project.
5. **Landowners let others plant** your unused land to create a neighborhood vegetable garden.

For more information in how you can help, contact Pete Pumphrey (872-7846) or Yvonne Wood (873-7854).

To volunteer as a gleaner (to pick produce), contact Kerri Lozito (872-2170).

For food drop off locations and hours, contact The Bishop Senior Center (873-5240), IMACA (873-8557), or the Salvation Army (872-2124).

-----Cut or tear here -----

Bring your completed volunteer form to **Bishop Nursery** or **Chalfant Big Trees Farm** for **10% off** on vegetable plants and seeds or **send them to : Yvonne Wood @ UCCE Inyo & Mono Co., 207 South St. Bishop, CA 93514.**

Be a part of the longstanding tradition of gardeners by sharing their bounty with others.

I want to help EASTERN SIERRA HARVEST by:

- Plant And Deliver Fresh Fruits/Vegetables** **Glean (pick produce left on tree or vine)**
 Sharing Growing Space With Other Gardeners **I have land available for others to grow**

NAME: _____

E-mail _____

ADDRESS: _____

Phone _____

Salt Tolerance of Vegetable Crops in the West

By Yvonne Wood

Planting a vegetable garden in our southern Inyo County desert regions presents several challenges -- not the least of which is preventing leaf burn and reduced yield due to salty soils. Soil salts can be troublesome **except** for those gardening on the eastern slopes of the Sierra Nevada. Here soils formed in granitic glacial moraines and outwash generally have rapid infiltration and salts are leached to depth. Salts can be especially problematic in garden soils the closer you live to the dry, dry environs of Death Valley. As well, they can be problematic for gardeners who live where mountain ranges intersect the valley floor because uphill salts will be leached downslope.

One method to lower the impact of soil salinity (or saltiness) on your garden's yield is to plant crops that have a moderate to high tolerance to salts. Different crops -- and even cultivars of a specific crop -- can vary widely in their tolerance to salinity. So ferreting out information about salt tolerance can be valuable in insuring a positive gardening experience.

Sensitive vegetables include radishes, celery, and green beans among others. Salt tolerant crops include beets, kale, asparagus, and squash. Moderately tolerant crops are tomatoes, broccoli, cabbage, cauliflower, lettuce, corn, potatoes (including sweet potatoes and yams), peppers, carrots, onions, peas, spinach, and cucumbers.

If you suspect salty soils may be having an impact on the yield of your garden, look for a few tell-tale signs near where you live. Do you observe soil surface salt 'effervescences' (visible white accumulations of salt due to the evaporation of water) as the soil dries from rain storms or snow melt on open land nearby? Do you note the presence of salt bush or salt weed on open land? Do the leaves of your garden vegetables -- especially those deemed salt sensitive or moderately salt sensitive -- show burn around the edges?

It can also help to keep a year to year garden journal to document which crops did best and worst in your soil garden plot. In this regard, climate can also influence a crop's tolerance to salt. The yield of onions, for example, is much more severely affected in hot, dry areas than in cooler, more

humid ones. Beets, on the other hand, are hardly influenced by climatic differences.

Also, pay special attention to your tillage methods when seeding or planting seedlings. For instance, if you plant into raised beds interspersed with furrows for irrigation, do not form flat-topped beds. Instead, form sloping beds which rise to a peak, and plant double rows of seeds or seedlings -- one row on each sloping side. This geometry lessens the impact of salt accumulated in the raised bed on your young plants.

For more information on the salt tolerance of vegetable crops, see **Water Quality Guidelines for Vegetable and Row Crops** (<http://news.ucanr.org/mediakits/Drought/droughttipquality.pdf>) and **Soil Salinity, Salt Tolerance and Growth Potential of Horticultural and Landscape Plants** (<http://ces.uwyo.edu/PUBS/WY988.PDF>).



Catalogues to consider when planting your garden:

We are very fortunate to have several excellent nurseries -- with knowledgeable and friendly staff -- located within our two counties. However, for those who also like to browse catalogs looking for those unusual additions to their flower and eating gardens, consider these:

High Country Gardens -- Plants for the Waterwise Garden and Beyond

This catalog features plants which have been 'grow-tested' at an elevation of 7000 feet. It is very thoughtfully put together with many suggestions for your drought-tolerant garden, or western hummingbird or butterfly garden. www.highcountrygardens.com or 1-800-925-9387.

The Cook's Garden -- Seeds and Plants for Gourmet Vegetables

Founded in Vermont 25 years ago, this company's catalog offers heirloom and hybrid seeds and plants selected especially by and for gardeners -- and their friends -- who love to cook. www.cooksgarden.com or 1-800-457-9703.

Territorial Seed Company

An Oregon company focussed on promoting people's self-sufficiency and independence through an abundance of good tasting fresh-from-the-garden food. Filled with cultural how-tos for garden vegetables and fruits. www.territorialseed.com or 1-888-657-3131.

Burpee Gardening

An American standard..... www.burpee.com or 1-800-888-1447.

In this issue:

Solarization—Soil solarization can reduce weed seeds and soilborne diseases. Solarizing involves leaving a clear plastic tarp on the soil surface for 4 to 6 weeks during the hottest part of the year. It works well in warm areas but may be ineffective in low-temperature areas. See pages 1 and 2 for how to solarize your yard.

Growing gardens at higher elevations—Read how the Shibleys grow a fantastic garden every year in Crowley Lake on pages 3 and 4.

Hot off the Presses—What's new on line?—Do you need help with your garden or are concerned about food safety? On pages 4 and 5 is a list of free publications you can download from the UC ANR Website. If you don't have an internet connection, call our office and we will make you copies to pick up.

Help out your community—Do you have surplus vegetables & fruits each year? See page 6 for details on how you can contribute.

Salty soils in southern Inyo County—What can you do about salty garden soils? See page 7 for the article entitled "*Salt Tolerance of Vegetable Crops in the West*".

In the spring, at the end of the day, you should smell like dirt.

~Margaret Atwood

It's the time of the year when gardeners anticipate their summer bounty -- fruit, vegetable, and flowers -- and questions abound on how to improve yield and bloom. We hope that you find some useful information in this newsletter, and welcome comments and suggestions for topics in our future issues.

And remember—even though sunny days are begging for you to come out and plant—locales in Inyo and Mono Counties are still not past the possibility of freeze. Statistically, the latest freeze date for Independence is May 25, for Bishop is June 10, for Shoshone is April 30, and for Furnace Creek is April 21. And in Bridgeport and Bodie, there is a chance of freeze anytime throughout the year! So as you begin, be prepared to offer protection from frost to your garden!

Sincerely,

Yvonne A. Wood
Farm Advisor & County Director



The University of California, in accordance with applicable State and Federal laws and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, medical condition (cancer-related), ancestry, marital status, citizenship, sexual orientation, or status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment. Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action Director.



For special assistance
regarding our programs,
please contact us.

Return Service Requested

COOPERATIVE EXTENSION
U.S. DEPARTMENT OF AGRICULTURE
UNIVERSITY OF CALIFORNIA
207 W. SOUTH STREET
BISHOP, CA 93514

NON-PROFIT
ORGANIZATION
U.S. POSTAGE
PAID
PERMIT NO. 29