

## February 2009—Oklahoma Gardening Shows

February 21 & 22

February 14 & 15—OETA Festival

February 7 & 8—OETA Festival

*Oklahoma Gardening* Information Sheet (#3535)

**OETA air date: February 28 and March 1, 2009**

OETA airtime: Saturday 11:00 a.m., Sunday 3:30 p.m.

**Intensive Bed Gardening** – We will follow an intensive bed garden system in our vegetable garden. This system maximizes production space by placing plants closer together. This is not to say the plants are crowded, but rather given just enough room to thrive. We have already established a permanent bed-row system in which we have a series of mounded beds with walkways in between. The idea behind this is that we reduce soil compaction by walking only in the rows and never on the beds.

Another key component to intensive bed gardening is plant spacing. Traditionally, for example, we plant okra 18 inches apart in rows spaced 2 to 3 feet apart. This gives each plant a rectangle 18 inches wide by 2 or 3 feet long in which to grow. But we all know okra does not grow in a rectangular shape, so why do we need the extra space between rows?

If you remove the row space, and plant okra in 18 inch rows, spaced evenly apart, there is a much more efficient use of space; we use about half as much area. This is square-center plant spacing. The intensive bed system reduces wasted space even more by planting in a tighter pattern based on the actual shape of the plants, that is, a circle. Using equidistant spacing between plants and staggering the rows, we maximize the use of space as the rows are pulled closer together. However, the plant centers are still 18 inches apart; we have just removed the dead space at the corners of our square-center plant spacing. Generally, you can use the recommended in-row spacing as a base for equidistant plant spacing.

It's one thing to proclaim we want to use an equidistant spacing with 18 inch centers; it's an entirely different thing to actually set plants or seeds out at the proper spacing. There are two general methods for seeding, broadcast seeding or sowing seeds individually.

Broadcast seeding is useful for planting blocks of plants that take up little space, crops like carrots, radishes, beets, turnips and leaf lettuce. When we broadcast seed, we spread the seeds evenly over the bed allowing them to germinate where they land. It is a fairly quick technique and useful for those tiny seeds that are nearly impossible to pick up individually. But it can be difficult to obtain an even distribution. Often when we broadcast seed, we end up with clumps of plants here and there and empty space in between. Before you seed, you may wish to practice over a sheet. After a few tries, you will be able to obtain a fairly even distribution. And when you are ready to try your hand in the field, don't underestimate the influence the wind has on where the seeds fall. Try to broadcast early in the morning when winds are at their slowest.

For larger seeds, we can set them individually in the garden exactly where we want the plant to grow. Such precision seeding requires two simple tools, a yard stick and a measuring tape. Lay the measuring tape along the length of the bed. This will be used to measure the distance between rows. The yard stick will be used to place the seed at the required plant spacing. I am going to demonstrate this with seed potatoes instead of actual seeds. The recommended plant

spacing for potatoes is 12 inches. The first row will be planted 6 inches from each edge of the bed, which is  $\frac{1}{2}$  of 12, or the center of the plant circle. Likewise, the first seed will be set 6 inches from the edge of the bed. This allows a 12 inch circle in which the potato plant will develop. The next seed is set 12 inches from the first, and so on.

Logically we might think that the second row is started 12 inches from the first, but this is not the case. Because we are using equidistant spacing, the second row is actually only 10  $\frac{1}{2}$  inches from the first. However, we stagger the location of the seeds in the rows, so that the centers are still 12 inches apart. We continue on in this manner down the length of the bed. This same individual plant spacing method can be used for any large seeds like beans or squash, and is also the same method used for setting out transplants.

There are a number of benefits to using this close plant spacing.

*Resource Conservation.* By planting the crops closer together in a smaller area, we have less area that needs to be watered, fertilized or otherwise managed. We avoid wasting water and fertilizer that might fall on bare soil between plants or rows in a conventional row garden. And as there is less space to prepare, we can do the work by hand, eliminating the need for machinery and fuel, such as for tillage.

*Increased yields.* Research in intensive bed gardens has also showed an increase in yield per unit area. This is largely due to the closer plant spacing.

The close spacing of the plants results in a dense canopy covering the soil below. This has many positive effects similar to those gained from using mulches.

*Weed Suppression.* Like mulch that we lay down on the soil, the shade produced by the canopy can reduce germination of weed seeds and also competes with weeds for light, reducing weed problems.

*Reduced Evaporation.* The shade also helps to cool soils in the heat of summer and slows water evaporation.

*Effects of Wind.* We also find less wind lodging when plants are placed closer together because they can support one another. In a growing bed, only the outside rows are exposed to wind, which helps reduce the drying effect winds have on plants, again helping to save water.

*Reduced Soil Compaction.* Finally, the dense canopy helps protect soils from heavy rainfalls, which reduces soil compaction.

A few additional aspects of intensive bed gardening include three-season planting, in which we have spring, summer and fall crops in the same bed. I will be demonstrating this as we plant throughout the course of the year. Intercropping or planting two or more crops together in a space is another useful planting method that we will explore. Our small space garden will utilize intercropping to maximize the diversity of crops produced in a relatively small space. We will take a closer look at the small space garden in the coming weeks.

Intensive bed gardening can be applied on many different size scales. If space is limited, growing beds are the best way to get the most from the available patch of land. But even if you

have ample space in the landscape, growing beds provide the most efficient and productive use of that space and reduce waste.

Like any vegetable garden, intensive bed gardening does take careful planning to optimize the use of space and organize your planting. Some wonderful resources to use when planning include OCES Factsheet HLA 6033 – Raised Bed Gardening, The Rodale Institutes’ “Getting the Most from Your Garden” and John Jeavons’ book “How to Grow More Vegetables”.

**Crop Rotation** – Garden planning is an important task – a well organized garden will allow you to make the most of the space you have. I have designed an intensive bed garden that includes crop rotation. The idea behind crop rotation is very simple – do not plant the same crop on the same piece of land each year. Instead we rotate crops to different areas of the garden over time. Rotations are generally based on the major crop families. These are:

- Brassicaceae – broccoli, cabbage, kale, cauliflower, bok choy, brussel sprouts, radish and rutabaga
- Solanaceae – potato, tomato, pepper, eggplant and tomatillos
- Curcubitaceae – cucumbers, squash and melons
- Fabaceae – beans and peas
- Chenopodiaceae – beets, chard and spinach
- Apiaceae – carrots, parsnip and parsley

Plants in different families have different nutritional needs and plants within a family tend to have similar cultivation needs. Growing plants from the same family together in one area of the garden makes sense for managing fertilization, pests and for general plant culture.

Because each plant family takes different nutrients out of the soil, it is a good idea to move the plant families from one area of the garden to another each year. Some crops, like cabbage and corn are heavy feeders. If you grow them year after year on the same patch of soil, they will quickly deplete the soil nutrients. Other crops, like legumes, fix nitrogen from the air and once the plants decompose, add more nitrogen to the soil than they remove. Moving crop families from one area of the garden to another each year helps in maintaining soil fertility.

Crop rotation also helps to manage insect and disease pests. In fact, it is one of the easiest steps that you can take in battling pests. Once they find a food source, they reproduce quickly and become problematic. When you plant the same crop in the same place year after year, you make it very easy for the offspring of that insect pest to find food, and so you have a big pest problem.

But many insect pests have limited mobility. If you move their food supply even just several yards away, you make it more difficult for the offspring of the pest to find food. Many will die in the search.

Our garden includes five sections for rotation. Each section has three growing beds. Of the plant families that I mentioned, there are four that tend to take up the greatest amount of space in the vegetable garden. These are the brassicas, curcubits, legumes and solanaceous plants. In designing the rotations, I assigned one of these four families to each section. I mentioned that I have five sections in the garden. The fifth section will be left fallow, meaning we will not grow a harvested crop. Instead, we will plant a cover crop in the fallow section to help rebuild soil fertility. We will look closer at cover crops later this season. I am applying crop rotation on a large scale. Crop rotation can be applied on a small scale as well as a large one. If my entire garden was this one bed, I could break it into four sections and rotate crops through each section.

Each of the five sections in our garden has been assigned to either be fallow or to one of the four major crop families. There are, of course, other plants that we want in our garden that do not fall into one of the four major families. Some of these, like lettuce, can fit almost anywhere in the planting scheme. Crops like onions and garlic have similar pest problems so we tend to move these through the garden rotation together the way we would plants from the same family. These extra crops can be added to the four sections of the garden based upon their season of production. For example, I found that okra and sweet potatoes fit very well into the brassica rotation because the brassicas are cool-season crops and the okra and sweet potatoes are warm-season crops. This pairing allows me to grow spring and fall crops of the brassicas, with a summer crop of okra and sweet potatoes all in the same three beds. Available space will also guide you in finding room for these extra crops.

Designing a planting plan can be a bit of a challenge, especially when you plan for three seasons of production. To get started you want to:

- Make a list of the vegetables your family enjoys eating
- Determine how much of each crop you wish to grow
- Identify how much space the desired crops will require
- Determine what season each crop will be planted in – spring, summer or fall

Once you have this information, you want to lay out possible planting arrangements. I used index cards to start identifying possible arrangements. The cards were different sizes corresponding to the amount of space a particular crop would occupy. I also used a color coding system to indicate if it is a cool-season or warm-season crop. Then I could move the cards around in different possible planting arrangements. You can do the same thing using tracing paper laid over a drawing of the planting beds to find the best arrangement of plants your garden.

**Starting Seeds Indoors** – Many gardeners choose to start their own seeds at home, rather than purchasing transplants. The advantages include savings in cost, and also the availability of a much wider selection of cultivars. You can also time seed sowing according to your expected planting date so that transplants are ready when you need them. Of course, planting seeds and tending seedlings is also a great way to spend a winter day.

You can start seeds in flats purchased from a plant supply company or garden center, you can use expandable peat pots or you can use a variety of household items. When selecting a container to start your seeds, consider drainage. We do not want water sitting in the bottom of our container. We also want to make sure the container holds enough media that it will not dry out too quickly and will have plenty of room for roots to develop.

The potting media you use is also important. Often you can find a media labeled specifically for seeding. What we look for in our media is both good drainage and high water holding capacity. These things seem contradictory, but we want our soil to hold adequate moisture for seeds to germinate without drying out too quickly, but we also want excess water to freely drain from the medium.

Light is often a limiting factor with starting seeds indoors. To produce hardy seedlings, you need 12 to 14 hours of light per day. Natural lighting is generally not enough. Supplement natural light using a shop light with alternating cool- and warm-white fluorescent bulbs.

To plant the seeds, sow in rows 2 to 3 inches apart. Use a fairly tight spacing within the row. As a rule of thumb, sow seeds to a depth of approximately 3 times the diameter of the seed. Most seeds will germinate well at a temperature around 70 degrees F held constant during day and

night. After germination, temperatures can be lowered according to the type of plant you are growing. Refer to OCES Fact Sheet HLA 6020, "Growing Vegetable Transplants" for ideal growing temperatures. For these tomatoes, a day temperature between 70 and 80 degrees F and a night temperature between 60 and 65 degrees F is ideal.

Managing water in seed trays can be tricky. Over-watering is a common problem. The seeds do not use much water until they have germinated and seedlings are actively growing. However, the seeds need moisture to germinate. Misting the soil until it is thoroughly damp is a good way to provide moisture. Then, cover the seed tray loosely with plastic, checking soil moisture periodically. Remove the plastic once you see seedlings emerge.

Though fertilizer labels recommend weekly fertilizer applications, an application every two to three weeks is usually sufficient. The first application is not needed until seedlings are ready to be transplanted, two to three weeks after sowing.

**Cutting Back Ornamental Grasses** – Ornamental grasses should be cut back in late winter before new growth emerges. It can also be done in fall, but the seed heads provide nice winter interest, and some birds will also feed on the seed. To make the job easier, you can tie up the stalks with string. Depending on the size and density of the grass you may use any of the following tools: house scissors, shears or hand pruners. For smaller grasses, trim to about 2 to 3 inches from the ground; for larger grasses cut 6 to 8 inches from the ground.

**Vegetable Garden Chores** – We can continue to plant our cool-season vegetables including carrots, chard, lettuce, peas, spinach, turnips and potatoes. In the southern part of the state you can add beets and radish to your planting list as well. If you plan to start seeds indoors, now is a good time to get your peppers, tomatoes, eggplant and tomatillos started. In the cooler parts of the state you may wish to hold off another week or so.

Please contact your local Oklahoma Cooperative Extension Service Office for more educational information on garden-related topics. If you need further information about this week's show, call (405) 744-5404 or visit our website <http://www.oklahomagardening.okstate.edu>. Thank you for your continued support!

Sincerely,  
Kim Rebek  
*Oklahoma Gardening Host*

\*\*\*\*\*

**Establishing a New Vegetable Garden** – This season we will feature fruit and vegetable production in the home garden. We will also manage our garden organically to help remove some of the mystery that surrounds that word “organic.”

### Site Selection

The following is a list of considerations when selecting a site for the vegetable garden:

- Sun exposure: select a site that receives at least 6 hours of direct sunlight each day. Southern exposures are ideal for greatest sun incidence.
- Soil: Well-drained soils such as sandy loam provide ideal conditions for growing vegetables. Soil pH near 6.6 is optimal. Avoid steep slopes where erosion will be a problem.
- Air flow: avoid low-lying areas as these tend to collect cold air which slows germination and plant development in spring.
- Avoid placing a vegetable garden near walnut trees. Walnuts exude a substance called juglone from their roots which is allelopathic, meaning it can kill other plants. Tomatoes and other solanaceous plants are highly sensitive to juglone.
- Make sure the site is situated near a water supply.

### Removing Vegetation

It is important to start with a clean slate when preparing a new garden bed. And this means removing existing vegetation and controlling weeds. Usually, this is a chore for the summer prior to planting. There are several methods available to kill off vegetation. The most common method is to apply an herbicide, but there are other non-chemical methods such as solarization and smothering.

Solarization is a simple technique that captures radiant heat energy from the sun uses that heat to kill seedlings and weed seeds, as well as some soil-born disease organisms. Sheets of plastic are used to trap the solar heat. Solarization is most commonly used to kill weed seeds in areas where the vegetative layer has been removed.

To smother weeds cover the soil with black plastic, or several layers of newspaper. I have also seen carpet or boards used for smothering.

You can combine solarization with other control methods. For example, you may choose to use an herbicide to make the initial kill, then solarize to control subsequent seedlings and kill seeds in the soil. Solarization can also be combined with the application of soil amendments and fertilizers. In fact, solarization can speed up decomposition of organic matter, releasing soluble nutrients into the soil.

Whatever method is used, it is ideal to control perennial weeds before establishing a new garden. It will be much easier to manage them before you have the area planted with vegetables.

### Soil preparation

Once the vegetation is removed, till the soil to loosen it. This is a good time to add manure or other organic material. To preserve soil structure, avoid tilling when the soil is too wet. To determine if the soil is too moist for tilling, grab a handful of soil and squeeze it slightly. If it

sticks together in a ball it is too wet. If it crumbles easily it is ready.

### How to Collect Soil for Testing

Soil tests should be included as part of garden preparation. It is easier to amend soils and add nutrients before we plant, rather than after. Soil tests collect information on soil nutrients and pH.

When collecting soil samples, you want to test areas with drastically different soil conditions separately. To get started you will need a tool for collecting small samples. A soil probe is a great tool for sampling, if you have one. You can also use a shovel or even a small bulb planter. You will also need a bucket for sampling. We want to obtain a representative sample for each area being tested. To do this, we need to collect a number of samples from across the entire area being sampled and combine them into a single, representative sample. In a large garden, we may take as many as 15 to 20 cores.

Using the probe collect a number of individual samples and mix them in the bucket. Make sure to use a clean bucket that does not have any cleansers in it. Many cleaners contain chemicals that could alter your soil test results. Take samples to a depth of six inches. I will mix these samples together, then fill the sample bag for analysis.

Sample bags are available at your county extension office, where soil samples may also be submitted. The samples are sent to the OSU Soil, Water, and Forage Analytical Laboratory for testing. Tests cost \$10 each, and evaluate soil pH, nitrate nitrogen, phosphorous and potassium contents. You can also request micronutrient tests as well as organic matter content and other specific tests. Test results include fertilizer recommendations specific to the type of vegetation growing on the site. Be sure to mark the proper space on the sample label indicating the type of area sampled, such as turf or garden.

Extension Leaflet [L-249](#) contains detailed information on collecting soil samples.

**Types of Cropping Systems and Establishing Raised Beds** – There are many ways to grow produce. Most common vegetable gardens grow rows of a single plant type. These are the vegetable gardens most of us grew up with and the common system on most commercial farms. However, there are many alternatives to traditional row systems that can help save space and increase the amount of produce you can produce in a small area. We will explore a number of these systems throughout the season including container gardening, vertical gardening and square-foot gardening.

The cropping system that we are using in our vegetable garden is an intensive bed garden, in which we have a series of mounded rows. This system is used to maximize planting area while still maintaining access to the planting beds for maintenance and harvest. Growing in mounded beds allows us to grow four or five traditional vegetable rows together in a smaller space. In essence, the intensive bed garden is a method used to avoid wasting space.

This series of graphics clearly demonstrate the advantage, in terms of space saving, gained by using the bed system over traditional rows. First we look at a traditional row cropping system, with the shaded areas representing the planted space. Rows are spaced according to conventional plant spacing recommendations. The second illustration shows a growing bed garden, again, the shaded areas show the space devoted to growing food. In the first illustration, only 32% of the area is actually devoted to producing crops, while in the garden bed system,

63% of the area is planted. This is a significant difference – we nearly double the amount of space used to grow vegetables.

Our intensive garden will include a series of five foot beds with permanent aisles between the beds. The idea is that the planting bed is always a planting bed, and the aisle is always an aisle. We only walk in the aisles, and never in the planting bed. This keeps the soil in the planting bed from becoming compacted and in theory eliminates the need for tilling once beds are established. When working in our beds, we never step into the bed, but rather work from the aisles between.

The width of the bed can be narrowed to three or four feet if you find it difficult to reach the interior of the bed. Also, the length can be adjusted according to available space. Our beds are 25 feet long. This system can also be translated to raised beds if you have difficulty working on the ground. When establishing the width and length of your bed, it may be easiest to develop beds that have a total area of 100 square feet, such as 4 foot by 25 feet, or 5 feet by 20 feet. The reason for this is that most garden recommendations, such as fertilizer rates, are given in amounts for 100 square feet. One final consideration is to develop all of your garden beds to the same dimensions, as it will be easier to plan crop rotations and to share equipment, such as row covers, between uniformly sized beds.

As you can see, I am simply pulling soil up from what will become the aisles into the planting beds to create mounded, raised beds. One advantage of raising the planting bed above the surrounding soil level is improving the soil drainage. My goal is to raise the planting bed six to eight inches above the aisles. I want the aisles to be relatively flat for ease of walking and kneeling. The planting bed is mounded, or slightly rounded on top, rather than flat. This increases the surface area available to plant. A flat top system is sometimes used if the soil is very poorly drained. If this is a concern, you can create a ridge at the top of the bed, or a trench at the bottom of the bed to catch water. After several years of improving the soil through additions of organic matter, this drainage problem should correct itself.

**Barb Cooks** – Barbara Brown, Extension Food Specialist, makes a ground beef and cabbage casserole.

**Vegetable Garden Chores** – For those of you ready to set out those early cool-season vegetables, we can start to sow a few seeds, especially in the southern part of the state. Now is a good time to seed carrots, chard, lettuce, peas, spinach and turnips. It is also time to start planting potatoes. You may wish to wait another week or two in cooler parts of the state before starting these seeds.

Please contact your local Oklahoma Cooperative Extension Service Office for more educational information on garden-related topics. If you need further information about this week's show, call (405) 744-5404 or visit our website <http://www.oklahomagardening.okstate.edu>. Thank you for your continued support!

Sincerely,  
Kim Rebek  
*Oklahoma Gardening Host*

# Ground Beef and Cabbage Casserole

- 1 pound lean ground beef
- 1 medium onion, chopped
- 1 clove garlic, minced
- 1/2 teaspoon salt
- 2 cups no salt added tomato sauce
- 1/4 teaspoon cinnamon
- 1/4 teaspoon ground cloves
- 1/2 teaspoon dried thyme
- 1/2 teaspoon dried basil
- 4 cups shredded cabbage



1. Preheat oven to 350°F. Spray a 2-quart casserole dish and lid with non-stick vegetable spray.
2. Brown ground beef and chopped onion in large skillet. When almost browned, add garlic and continue cooking until meat is completely browned. Drain.
3. To meat mixture in skillet add salt, tomato sauce, cinnamon, ground cloves, thyme and basil. Bring to a simmer and cook 10 minutes.
4. Spread half the cabbage in prepared casserole. Top with half the meat mixture. Repeat layers. Cover casserole with lid and bake in preheated 350°F oven 45 minutes.

Serves 6.

<b>Nutrition Facts</b>		
Servings per recipe: 6		
<b>Calories 196</b>	Calories from fat 81	
	% Daily Value	
<b>Total Fat</b> 9g	15%	
Saturated Fat 4g	18%	
<b>Cholesterol</b> 48mg	16%	
<b>Sodium</b> 249mg	10%	
<b>Carbohydrate</b> 11g	4%	
Dietary Fiber 3g	11%	
<b>Protein</b> 17g	33%	
Vitamin A: 16%	Vitamin C: 44%	Folacin: 9%
Calcium: 5%	Iron: 14%	Potassium: 17%

Modified from original source: [www.justvegetablerecipes.com](http://www.justvegetablerecipes.com) accessed 1/16/09

Barbara Brown, Food Specialist

Oklahoma Cooperative Extension Service

1/09

\*\*\*\*\*

OETA Festival—January 31 through February 15  
No *Oklahoma Gardening* shows available.