

GMG GardenNotes #713

Block Style Layout in Raised Bed Vegetable Gardens

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Block Style Garden Layout

Block style garden layout (also called *close-row* or *wide-row* plantings) increase yields five fold compared to the traditional row-style garden layout, 15 fold for the smaller kitchen garden vegetables. The compact design reduces weeding and is ideal for raised bed gardening.

The basic technique used in close-row, block plantings is to eliminate unnecessary walkways by planting vegetables in rectangular-shaped beds or blocks instead of long single rows. For example, plant a block of carrots next to a block of beets, followed with a block of lettuce and so forth down the bed area.

Plant crops with an equal-distance spacing between neighboring plants in both directions. For example, space a carrot patch on 3 inch by 3-inch centers. It may be easier to visualize this plant layout as running rows spaced 3 inches apart across the bed, and thinning the carrots within the row to 3 inches. A 24-foot long “traditional” row of carrots will fit into a 3 foot by 2-foot bed. [Figure 1]

Design the planting beds to be 3 to 4 feet wide and any desired length. This width makes it easy to reach into the growing bed from walkways for planting, weeding and harvesting.

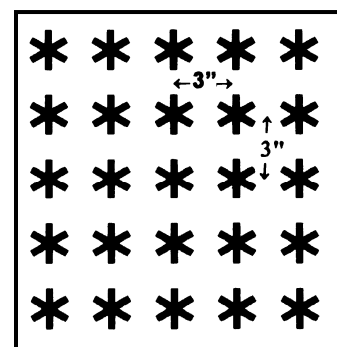


Figure 1. Carrots planted on 3-inch centers

Limiting foot traffic to the established walkways between planting beds reduces soil compaction. Design walkways to 18-24 inches wide. Mulch walkways with dry grass clippings, wood chips, or other organic mulch.

As the vegetable foliage grows together, the shade cast suppresses weed germination.

After harvesting a row of radishes, beets, lettuce, or spinach, replant for continual summer production.

Due to the higher plant density, block plantings require a weed-free, fertile, well-drained soil that is rich in organic matter. Give extra attention to watering and light, frequent fertilization to nourish the dense plant population. Avoid over-crowding vegetables; the reduced air circulation can increase disease problems.



Figure 2. Kitchen garden in block-style layout with (top to bottom) spinach, assorted lettuce varieties) and Swiss chard. Note that rows run across the four-foot wide bed. As a row of lettuce is harvested, it is replanted for continual production or neighboring crops fills in the space.

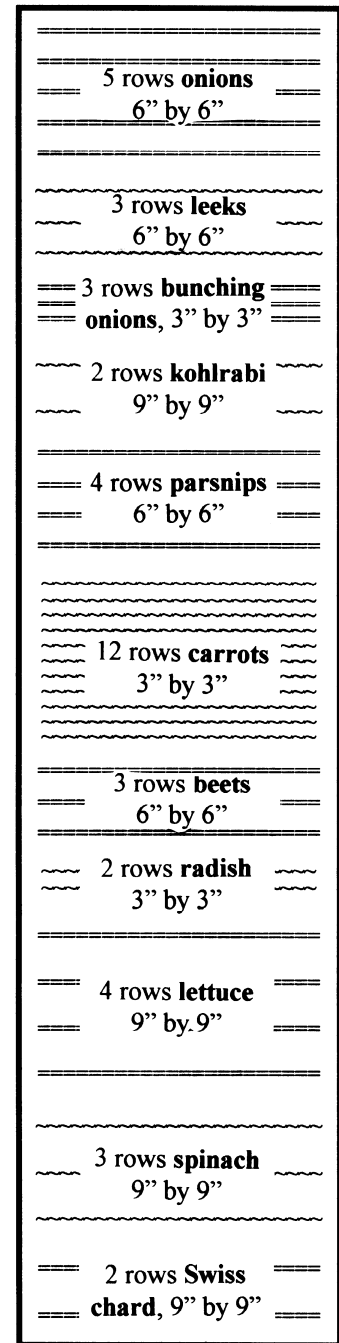


Figure 3. Sample kitchen garden

Suggested Spacing

Suggested spacing for kitchen garden vegetables: (Start with the wider spacings, reducing spacing with experience and as soil improves in fertility and tilth.)

- Beets: 4-6" by 4-6"
- Carrots: 2-3" by 2-3"
- Celery: 7-9" by 7-9"
- Garlic: 4-6" by 4-6"
- Kohlrabi: 7-9" by 7-9"
- Leeks: 4-6" by 4-6"
- Lettuce, head: 10-12" by 10-12"
- Lettuce, leaf: 7-9" by 7-9"
- Onions, bunching" 2-3" by 2-3"
- Onions, dry: 4-6" by 4-6"
- Parsnips: 5-6" by 5-6"
- Radishes: 2-3" by 2-3"
- Spinach: 4-6" by 4-6"
- Swiss chard: 7-9" by 7-9"
- Turnips: 4-6" by 4-6"

Other vegetables suited to block planting

Cole crops (broccoli, cabbage, Brussels sprouts and cauliflower) – Spaced at 18" by 18", or three plants across a four-foot bed.

Corn – Always plant in a block to facilitate pollination. Five rows wide is recommended for the best "pollen shower" to maximize kernel set; three rows wide is minimum. Space at 12" by 30" or four rows across two, four-foot wide beds.

Eggplant – Space at 18-24" by 18-24" (or two or three plants across a four-foot wide bed).

Peppers – Space at 15" by 15" (or three plants across a four-foot wide bed).

Potatoes – Space at 12-15" by 12-15" (or three plants across a four-foot wide box).

Vine Crops (squash, cantaloupes, pumpkins, and watermelons) – Place a single row down the center of a four-foot wide box. They may also be planted in larger blocks, several rows wide. Place the winter squash and pumpkins in the center of the block and cantaloupes, watermelons, and summer squash around the edge where they can be reached for summer harvest.

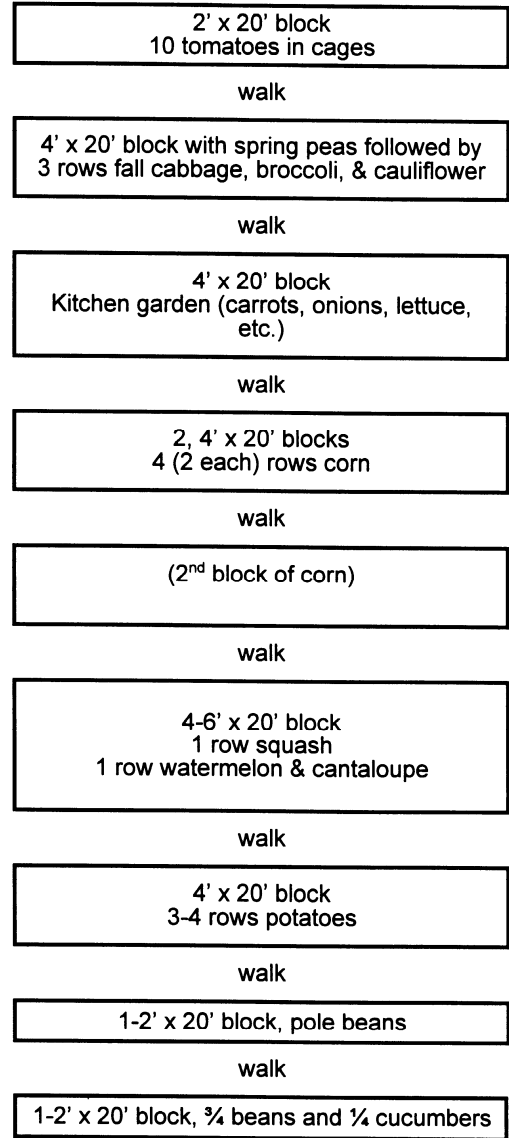


Figure 4. Sample block-style garden

Trellis tomatoes and cucumbers to save space and make harvest easier. The increased air circulation around trellised tomatoes helps suppress tomato blight. Space trellised tomatoes a minimum of 24 inches apart down a single row, in a block two to three feet wide. Plant cucumbers along a trellis at 9-12 inch spacings.

Beans and peas may be easier to pick and are less disease-prone if planted in single or double rows, rather than block style planting. Space beans 12” between rows and 4four inches between plants. Plant a double row down a block two to three feet wide.

Figure 5. Raised bed garden with chard, lettuce varieties, spinach, beets, and onions. Because even water distribution is needed for this bed with a heavy plant population, the drip irrigation hose is run up and down the bed four times on a 12” spacing. The bed will be mulched with dry grass clippings to conserve water and control weeds in summer. Wood chips make an excellent mulching material between beds.



Raised Bed Gardening

Raised bed gardens with block style layout have many advantages, including the following:

- Higher yields and less area to weed** – The block style layout, eliminating unnecessary walkways increases yields by five-fold over the traditional row-path-row garden layout.
- Reduced soil compaction** – Established walkways keep foot traffic off the growing bed, reducing soil compaction.
- Earlier planting** – The raised bed facilitates better runoff and drainage allowing soil to warm faster in the spring. Beds can be covered with plastic during spring rains, allowing for early planting even in rainy years.
- Frost protection** – The block-style layout is easy to cover for spring and fall frost protection. It can also be shaded in the hot summer.
- Soil improvement** – The raised bed is a clearly defined area where the gardener can concentrate on soil improvement techniques, that is the addition of soil organic matter. In situations where the soil is poor, limiting plant growth, good planting soil may be added to the box.
- Architectural interest** – Raised beds become an architectural feature of the landscape design.
- Accessible Gardening** – The raised bed is ideal for enabling persons with limited mobility to garden.

Constructing a Raised Bed Garden

Size – A bed four feet wide is ideal for most vegetable crops, allowing the gardener to reach the entire bed from the side without ever stepping on the soil in the growing bed.

Tomatoes are well suited to a bed 24” to 36” wide, with one row of plants down the middle. Beans and peas are easier to pick in a single or double row down a bed rather than in the block-style planting. Here a bed 24 inches wide would be ideal.

Length can be what ever works for the space.

Depth / Height – The height of the beds is generally of no consequence, assuming that crops can root down into the soil below the bed. For most home garden situations, the role of a raised bed is to define and separate the growing bed from the walkway. Here a four-inch height would be adequate. Variations in heights (4”, 6”, 8” and 10”) among different beds may help create an appealing landscape feature.

In situations where the soil below is not suitable for crop growth, eight to twelve inches of soil is considered minimal. Deeper beds would make management easier.

To accommodate gardeners with special needs, bed height may be raised to minimize bending or to allow gardening work from a wheelchair. Plan walkway space between beds wide enough to accommodate specialized equipment or mobility.

For ease of irrigation, beds should be reasonably level, both across and length-wise.

Orientation – For frost protection, an east-west orientation has a slight advantage of collecting heat. For summer crop growth, a north-south orientation has a slight advantage of sunlight on both sides of the plant row each day. Because there is no clear advantage, orient the beds in whatever direction work best for the landscape design. Often beds are best arranged to be an appealing landscape feature of the property.

Construction materials – A simple way to construct a raised bed garden is to use construction lumber (2 by 4s, 2 by 6s, 2 by 8s and 2 by 10s). Untreated lumber will last for several years, except in high salt areas or wet sites. Simply cut two pieces the width of the bed (typically four feet) and two others to the desired bed length. Using three and one-half to four inch decking screws, screw the corners together to make a four-sided box. Place the box-like frame on the soil and fill.

Various landscaping timbers may also be used in like fashion. However, do not use CCA pressure treated lumber (arsenic concerns) or railroad ties (creosote cancer concerns). Brick or other building materials may also be suitable.

Raised beds may also be made without sides. Here, organic matter is mixed in at the same time the garden is tilled. Walkways are dug down with the soil thrown up on the bed. Beds are four feet wide at the base and three feet wide at the top. The entire bed is covered with organic mulch like dry grass clippings to prevent soil erosion and reduce compaction from rain and sprinkler irrigation. [Figure 6]

Figure 6. Raised bed garden without sides. Beds are four foot wide at the base and three foot wide at the top. Walks were dug down with soil placed on the beds.



Adding soil – In the typical garden setting where crop roots will spread down into the soil below the bed, it is best to use similar soils. It may be beneficial to “double-dig” the beds. In “double-digging”, the top six inches of soil is moved from one side of the bed to the other side of the bed. Mix organic matter into the soil below the excavated side. Return the soil to the top, mixing in organic matter. Then repeat the process for the other side of the bed.

When adding soil, avoid creating a situation where one type of soil ends and another begins. This creates a line between soil types that impedes water and air infiltration and slows, or even stops, root penetration. If the soil being added to the bed is different from the soil below, mix some of the two together before adding the remainder to avoid a distinct line of change.

In situations where the entire rooting zone will be in the raised bed, a soil on the sandy side with 4-5% organic matter would be preferred.

When purchasing soil, be aware that there is no legal definition of topsoil or planting soil. Just because it is commercially available in bulk or sold in bags, does not necessarily mean that it is good for gardening. Many bagged, bulk soils, and soil amendments are prepared with compost made with manure and may be high in salts.

Figure 7. A recently planted raised bed garden. Corn boxes to left, kitchen garden in center, strawberry patch on right, tomato patch in back with black plastic mulch. Growing beds are mulched with grass clippings; wood chips were used between beds.



Gardening in a Raised Bed

Due to the high plant population, raised beds require better than average soils and more frequent irrigation and fertilization. Concentrate on improving soils with routine applications of organic matter. For details on soil improvement and fertilization, refer to the various CMG GardenNotes available on-line at www.cmg.colostate.edu.

Mulching – Mulch beds to control weeds, conserve soil moisture, and regulate soil temperatures. Grass clippings make great mulch when applied in thin layers (up to ¼ inches thick.) Allow each layer to dry between applications. Do not use clippings from lawns treated with weed killers or other pesticides for at least 4 weeks after application. Wood/bark chips are great for mulching between the beds. 3-4” of chips will minimize the compaction forces of foot traffic. Do NOT mix wood/bark chips into the growing bed; it will interfere with seedbed preparation. For additional information on mulching, refer the to the CMG GardenNotes #715, *Mulches for the Vegetable Garden*.

Watering a raised bed – Drip irrigation is well suited to raised bed gardening. It is rather easy and inexpensive to add a water tap at the end of each box. Alternatively, simply move a garden hose in turn to each box and connect the drip hose. Sprinkler irrigation is also suitable, but less desirable due to potential disease problems. For details on irrigation, refer the CMG GardenNotes #714, *Irrigating the Vegetable Garden*.

As a point of clarification, raised bed gardening is a water conservation technique. It does require more frequent irrigation due to the higher plant density. However, it is more efficient resulting in higher yields for the amount of water applied compared to the larger areas watered in traditional row-walkway-row culture. Raised beds become even more efficient when watered with drip irrigation or soaker hoses on timers.

Frost protection – An advantage of raised bed, block style layout is that the bed is easy to cover for protection from springs rains and frost, allowing for early planting.

This picture illustrates a Quonset-type cold frame covering made of concrete reinforcing mesh covered with plastic. This style of frost protection adds 2 to 6+ weeks on both ends of the growing season for cool season vegetables. Any type of covering must be opened during the day to prevent overheating. For details on frost protection techniques, refer to the CMG GardenNotes #722, *Frost Protection and Extending the Growing Season*.



Figure 8. Frost protection covering adds 2-6 plus weeks to the growing season.

Additional Information – CMG GardenNotes on vegetable gardening:

#711	Vegetable Garden: Soil Management and Fertilization	#718	Early Blight of Tomatoes
#712	Sample Vegetable Garden Seed Catalogs	#719	Vegetable Garden Hints
#713	Block Style Layout in Raised Bed Vegetable Gardens	#720	Vegetable Planting Guide
#714	Irrigating the Vegetable Garden	#721	Sample Planting for Raised-Bed Garden
#715	Mulches for the Vegetable Garden	#722	Frost Protection and Extending the Growing Season
#716	Water Conservation in the Vegetable Garden	#723	Growing Vegetables in a Hobby Greenhouse
#717	Growing Tomatoes	#724	Vegetable Gardening in Containers

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