YEAR ‘ROUND VEGETABLE GARDENING

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ESSENTIALS FOR SUCCESS

1. PLANTING DATE
2. PLANTING DATE!
3. VARIETY
4. EVERYTHING ELSE

Impact of planting date

Produce examples

Planting calendar
VA R IE TIES:

- Locally adapted
- Pest resistance
- Maturity date
- Special characteristics (e.g. keeping)
- Sow two or more
- Personal taste

SOIL PREPARATION 1:

- Digging
  - Spade vs fork vs shovel
- Double digging
- Rototiller
  - Small – front tine
  - Large – rear time

Hand digging

Small tiller for small areas
### SOIL PREPARATION 2:
- Correct planting date is critical!
- Excess soil moisture can delay ground preparation in winter and early spring
- Prepare soil, make beds, etc. under dry conditions.
- Cover beds with black plastic.
- Remove plastic and plant at correct time.

### BLACK PLASTIC MULCH
![Black Plastic Mulch]

### COMPOST & FERTILIZER
- Compost – as much as possible, especially potatoes and squashes, cucumbers, melons
- Balanced (15:15:15) at ground prep. (no not use weed & feed)
- Nitrogen - side-dress during crop

### SOIL COMPACTION!
- Loss of soil structure
- Water penetration
- Restricted rooting
- Soil preparation harder

Do not walk on the soil

### IRRIGATION
- Essential in a Mediterranean climate!
- Most vegetable crops are not drought tolerant.
IRRIGATION QUESTIONS:

- HOW MUCH?
- WHEN?
- METHOD OF APPLICATION?

WATER USE BY PLANTS:

<table>
<thead>
<tr>
<th></th>
<th>Inches/day*</th>
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<tbody>
<tr>
<td>WINTER</td>
<td>0.0-0.1</td>
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<tr>
<td>SPRING/FALL</td>
<td>0.05-0.20 (-0.5)</td>
</tr>
<tr>
<td>SUMMER</td>
<td>0.15-0.35 (-0.6)</td>
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* Well watered, solid canopy

DON’T GUESS

- Measure sprinkler output
  - Rain gauge(s), coffee cans
- Measure hose delivery rate
  - Gallons/min (run time X area watered)
- Use manufacturers information
  - Gallons/emitter; gallons/100 ft of tape
- Trial and error
  - Check depth of water in soil

BEST TIME TO IRRIGATE?

For sprinklers:
- BEST: midnight to 6:00 a.m.
- OK: 9:00 p.m. to midnight & 6:00 to 8:00 a.m.
- POOR: 8:00 to 10:00 a.m. and 5:00 to 9:00 p.m.
- WORST: 10:00 a.m. to 5:00 p.m

For furrow or drip:
Not so critical, but beware hot water in hose

HOW OFTEN TO IRRIGATE?

- DAILY
  - NEVER FOR ROUTINE IRRIGATION
  - TRANSPLANTS AND SEEDLING EMERGENCE
- EVERY 2 DAYS
  - MAY BE NEEDED FOR SANDY SOIL
- EVERY 4 DAYS
  - PROBABLY OK FOR MOST LOAM SOILS
- WEEKLY
  - OK FOR DEEP ROOTED CROPS IN HEAVIER SOILS

General rule for watering:

Must irrigate to wet entire soil profile to rooting depth

Typically 12” to 18” in most garden soils

Typically 12” to 18” in most garden soils
**IRRIGATION METHODS:**

Do not use hand held hose!

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<thead>
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<tbody>
<tr>
<td>1.</td>
<td><strong>Furrow</strong> (cheapest to set up, but hard to automate)</td>
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<tr>
<td>2.</td>
<td><strong>Sprinklers</strong> (hard to water small areas)</td>
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<tr>
<td></td>
<td>1. Spray</td>
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<tr>
<td></td>
<td>2. Pulsating (Rainbird-type)</td>
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<tr>
<td>3.</td>
<td><strong>Drip</strong></td>
</tr>
<tr>
<td></td>
<td>1. (Tubing and emitters; soaker hoses)</td>
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<tr>
<td></td>
<td>2. Tape (8” ‘T-Tape’ &amp; ‘tape-loc’ connectors)</td>
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**MULCHES**

Type depends on intended use:

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<tbody>
<tr>
<td>1.</td>
<td>Soil structure/water penetration</td>
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<td>2.</td>
<td>Keeping soil dry</td>
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<td>3.</td>
<td>Water saving</td>
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<td>4.</td>
<td>Weed control</td>
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<tr>
<td>5.</td>
<td>Insect management/other pests (e.g. birds &amp; cats)</td>
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<tr>
<td>6.</td>
<td>Climate modification/protection from extremes</td>
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**MULCH MATERIALS**

- Natural products (bark, compost, chips, grass clippings, etc.; beware slugs & snails, sow bugs, earwigs)
- Rock, gravel, etc. (not in veg. garden)
- Solid plastic (clear, black, colored, IR)
- Woven plastic (weed mat & shade-cloth)
- Floating row covers

**SUPPORTS**

Crops needing supports include:

- Tomatoes (non-determinate)
- Pole beans
- Most peas
- Cucumbers
- Cantaloupes, crenshaws, etc.
- Fava beans
- Other

**AVAILABLE SUPPORTS:**

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<td>1.</td>
<td>Poles and strings</td>
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<td>2.</td>
<td>Commercial ‘trellises’</td>
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<tr>
<td>3.</td>
<td>Homemade horizontal trellis for ‘scrambling’ plants that are not climbers</td>
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<td>4.</td>
<td>Garden fencing cylinders (for light duty climbers, e.g. sweet peas)</td>
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<tr>
<td>5.</td>
<td>Concrete reinforcing mesh &amp; ‘T’ posts (for heavy duty climbers)</td>
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**Note:**
Most commercially available supports in garden stores and catalogs are ‘toys’.
Cucumbers on concrete reinforcing mesh

Beans ‘go’ by themselves

SHADE
- Protect seedlings during germination in summer
- Protect transplants during establishment in summer
- Stop sunburn

Shingles for shading transplants

Shade cloth for shading seedlings
PEST MANAGEMENT

Correct identification of the problem, and pest involved, is essential in order to choose correct management strategy.

Pesticides?

- Read and follow the label directions!
- It is a legal document
- Applying a pesticide contrary to the label is breaking the law
- Read what is the required clothing (personal protective equipment or PPE)

Crop specifics:

- Notes = variety choice reasons; cultural info.; spacing; pests/problems.
- Time-lines, including varieties
  - note warm season (Dec. – Dec.) vs. cool season (June – June).
- ‘GH’ means starting in greenhouse, cold-frame, window, etc.

SPRING/SUMMER

(April to December)
NOTES FOR TOMATOES

Variety choice comments:
Pest resistant varieties essential for: Verticillium, Fusarium, nematodes
Non-determinate vs determinate?
Choice depends on size, taste, & use
Ability to set in hot weather
Heirloom varieties?

Cultural information/growing tips:
Supports needed for non-determinate varieties

Row spacing:
Typically 5’ to 6’ between single rows; 12” to 24” in-row

Pests/problems to watch for:
Sunburn; hornworms, stinkbugs, blossom end-rot

INDETERMINATE

DETERMINATE

T' posts
Concrete reinforcing mesh

Growing plant
Middle flower
Terminal flower truss
Lateral flower truss

Big Beef

Varieties:
INDETERMINATE
DeSign (F1)
Big Beef
DeCora

DETERMINATE
Big Beef
DeCora
DeSign (F1)

In the previous section, we briefly mentioned tomato support. The best support is a ‘T post’ with 22 gauge galvanized wire. If you are using a ‘T post’, then you will need 2” galvanized wire (not your standard 16 gauge). I prefer a mesh that has a 1 inch by 1 inch opening. The wire can be dispensed from a spool, and you can cut the desired length. It is important to tension the wire so that it is level. This is very important in the ‘T post’ method because a ‘T post’ does not have the ability to adjust. For the ‘T post’ method, you need to remove the plant from the ground and then stake the vine in the ‘T post’ method.最好使用“T”型支架，并且使用22号镀锌铁丝。如果你使用“T”型支架，那么你需要使用1英寸x1英寸的开口的2号铁丝。我更喜欢网眼为1英寸x1英寸的网眼类型。重要的是要拉紧铁丝，使其水平。对于“T”型支架的方法，你需要将植物从地面移除，然后用“T”型支架的方法固定在植物上。
NOTES FOR SPRING CARROTS

Variety choice comments:
Variety depends on soil type

Cultural information/growing tips:
Can save seeds of non-hybrid varieties (problem of space and ‘weeds’)  
Classic biennials; do not sow too early  
Do not transplant  
Must be thinned! Suggest sequential thinning  

Row spacing:
Broadcast, or typically 6” between single rows (suggest 3 rows on 24” bed); thin to not less than 1½” to 2” in-row  

Pests/problems to watch for:
Carrot root aphid
NOTES FOR SWEET CORN
Variety choice comments:
Different maturity dates for extended harvest
Sweetness type: SU = normal sugar; SE = sugary enhanced;
Sh2 = supersweet
Color: yellow vs. white (vs. mixed, red, etc.)
Cultural information/growing tips:
Sequential sowings for continuous harvest
Wind pollinated; plant in blocks, not single rows
Side-dress nitrogen fertilizer at about 12” and 30” tall
Do not stress for moisture, especially during tasseling; pollen can be killed by high temperatures
Hill up at about 8” to 12” tall to help prop roots
Row spacing:
Between row: 28” to 40”; approx. 8” in-row. Or sown in hills
Pests/problems to watch for:
Corn earworms (plant early to avoid), aphids, smut

SWEET CORN TIME-LINE & VARIETIES:
Silver queen (SU) 92
Early sunglow (SU) 63
Early choice (SE) 66
Silver princess (SE) 76
Silver king (SE) 82

NOTES FOR BEANS
Variety choice comments:
Bush vs pole (pole are easier to pick & higher yield; require support)
Personal taste
Cultural information/growing tips:
At least 2 sowings for longer green bean harvest
Sow to moisture; do not irrigate until after emergence
Do not handle foliage when wet
Keep green beans picked for prolonged harvesting
Do not plant limas until soil is thoroughly warmed up
Row spacing:
Bush: between row: 30” to 40”; approx. 6” in-row.
Pole: between row at least 4 ft; approx. 6” in-row
Pests/problems to watch for:
Mites sometimes; watch for aphids on limas

GREEN BEAN TIME-LINE & VARIETIES:
Kwintus (pole)
Roma II (bush)
LIMA BEANS
Big Mama (pole)

CUCUMBERS
NOTES FOR CUCUMBERS

Variety choice comments:
- Use is major determinant (slicing, pickling, etc.)
- Burpless vs normal
- Size of vine (bush vs vining)

Cultural information/growing tips:
- Double dig, lots of compost if available = larger rooting volume
- Heavy water users; use extra drip line or irrigation
- Grown on a trellis saves space (+ better shaped fruit); need ‘weaving’
- Keep picked for extended harvest

Row spacing:
- Trailing vines: between rows: 5 ft to 6 ft; or sown in hills
- On trellis: 4 to 5 ft between rows; 8” to 12” between plants

Pests/problems to watch for:
- Melon (= cotton) aphids can kill plants; whiteflies; cuc. mosaic virus

NOTES FOR MELONS

Variety choice comments:
- Taste is major determinant
- Size of vine
- Watermelon is ? unless very large area available

Cultural information/growing tips:
- Double dig, lots of compost if available = larger rooting volume
- At least two sowings for longer harvest
- Heavy water users; use extra drip line or irrigation
- Grown on a trellis saves space (fruit may need support); need ‘weaving’

Row spacing:
- Trailing vines: between rows: 5 ft to 6 ft; or sown in hills
- On trellis: 4 to 5 ft between rows; 8” to 12” between plants

Pests/problems to watch for:
- Melon (= cotton) aphids can kill plants; whiteflies; cuc. mosaic virus

NOTES FOR SQUASH (ALL)

Variety choice comments:
- Taste, and use, are major determinants
- Size of vine
- Pumpkins only if space available

Cultural information/growing tips:
- Require relatively large area for spreading vines
- Double dig, lots of compost if available = larger rooting volume
- Heavy water users; use extra drip line or irrigation
- Grow under floating row covers until start of flowering
- Keep picked (daily in high season for zucchini)

Row spacing:
- Trailing vines: between row: 5 ft to 6 ft; or sow in hills

Pests/problems to watch for:
- Cucumber mosaic can be serious problem with zucchini; squash bugs, western striped cucumber beetle, aphids, whiteflies
PEPPERS & EGGPLANT

NOTES FOR PEPPERS & EGGPLANT

Variety choice comments:
For peppers personal taste is #1; also color
For eggplant shape and color

Cultural information/growing tips:
Warm-season plants; do not try to start too early
High water use; need extra irrigation. Additional drip line

Row spacing:
Between row: 28” to 40”; approx. 9” to 12” in-row.

Pests/problems to watch for:
Hornworms and mites occasionally, sunburn on bell peppers

PEPPER TIME-LINE & VARIETIES:
Yolo Wonder, Cal Wonder
Big dipper

EGGPLANT:
Black beauty; Black bell
Burpee Hybrid

SUMMER PLANTING FOR FALL/WINTER

(June to June)

BRUSSELS SPROUTS & FALL CABBAGE

NOTES FOR BRUSSELS SPROUTS & FALL CABBAGE

Variety choice comments:
Differing maturity dates for longer harvest

Cultural information/growing tips:
Classic biennial; must grow vegetative structure before winter; overwintered plants will bolt in spring without producing
Direct seed or transplant (preferred)
Require shade during germination/establishment; suggest 50% shade-cloth
Side-dress nitrogen once well established
Expect to have to control pests listed below

Row spacing:
Minimum 18” to 24” between rows; 12” to 18” in-row

Pests/problems to watch for:
Cabbage aphid; imported cabbage worm, loopers; sunburn
Brussels sprouts time-line & varieties:
Jade cross hybrid
Bubbles
Vancouver, Tasty nuggets

FALL Cauliflower Time-line & Varieties:
Wentworth (73)
Minuteman (51)
(Milky way X)
Fall Broccoli Varieties
Goliath (76)
Diplomat (100)
Premium crop X (62)

NOTES FOR FALL BROCCOLI & CAULIFLOWER
Variety choice comments:
Differing maturity dates for longer harvest
Cultural information/growing tips:
Although biennials planting date not so critical as harvest is immature flower parts
Direct seed or transplant (latter is easier in summer?)
Shade is needed during germination/establishment in hot weather; suggest 50% shade cloth
Do not stress cauliflower, otherwise they ‘button’
Side-dress nitrogen once well established
Expect to have to control pests listed below until November
Row spacing:
Minimum 18” to 24” between rows; 12” to 18” in-row
Pests/problems to watch for:
Cabbage aphid; imported cabbage worm, loopers
NOTES FOR FALL CARROTS

Variety choice comments:
Variety depends on soil type

Cultural information/growing tips:
Can save seeds of non-hybrid varieties (problem of space and ‘weeds’)
Classic biennials; must grow root before onset of winter
Do not transplant
Must be thinned! Suggest sequential thinning

Row spacing:
Broadcast, or typically 6” between single rows (suggest 3 rows on 24” bed); thin to not less and 1½” to 2” in-row

Pests/problems to watch for:
Carrot root aphid !!
NOTES FOR RUTABAGA, TURNIPS & PARSNIPS

Variety choice comments:
Limited selections available

Cultural information/growing tips:
Classic biennials; must grow vegetative structure before winter; over-wintered plants will bolt in spring without producing
Direct seed (root crops) and thin to stand
Require shade during germination/stand establishment; suggest 50% shade-cloth
Side-dress nitrogen once well established
Store in ground in winter

Row spacing:
Minimum 18” to 24” between rows; approx. 6” in-row

Pests/problems to watch for:
Cabbage aphid; imported cabbage worm, loopers on turnips & rutabaga
Whitefly on parsnips

NOTES FOR PEAS & FAVA BEANS

Variety choice comments:
For peas intended use (snap, sugar, shelling) and vine height
No such thing as a pea that tolerates over about 80 F
Mildew resistance in pea is useful
Avoid ‘leafless’ varieties

Cultural information/growing tips:
Cool season plants; must mature before weather warms in spring as plants do not tolerate much over 80 F; avoid moisture stress.
Direct seed or pregerminate peas; direct seed fava beans
Tall pea varieties typically have higher yield, but require supports
Keep seed of both crops
Fava beans make excellent winter cover crop

Row spacing:
Peas: minimum 40” between rows; approx 4” in-row
Fava beans: 30 to 40” between rows; 6” in-row (need support)

Pests/problems to watch for:
Black bean aphid on fava beans some years; birds & mildew on peas
NOTES FOR SPINACH

Variety choice comments:
- Heat/bolting tolerance
- Mildew resistance
- Flat versus savoyed leaves

Cultural information/growing tips:
- Cool weather plants; will bolt as soon as warm weather arrives in spring
- Keep well watered
- Floating row covers
- Sequentially harvest mid-age leaves & allow to regrow

Row spacing:
- 8” between rows; 6” in-row

Pests/problems to watch for:
- Green peach aphid, mildew
- Slugs and snails!!

SPINACH TIME-LINE & VARIETIES:
- Teton hybrid
- Melody hybrid (savoyed)
- Tyee (semi-savoyed)
- Giant 157 hybrid (vigorous, flat)

NOTES FOR LETTUCE

Variety choice comments:
- Head vs butter head vs leaf vs cos etc.
- Color and leaf type
- Heat tolerance means 80°F, not 100°F

Cultural information/growing tips:
- Direct seed or transplant; transplanting better in spring?
- Sequential sowings needed to get extended harvest
- Suggest using floating row covers
- Initially thin to 2 plants per location

Row spacing:
- 8” between rows; 3 rows on 30” bed; thin to about 8” between plants

Pests/problems to watch for:
- Slugs, snails; birds; bolting

LETTUCE

LATE WINTER/EARLY SPRING

(December to December)

SPRING LETTUCE TIME-LINE & VARIETIES:
- Baja MI; Esmerala; Odyssey
- Mighty red oak; Red Express; Red derby MI
- Vivian, Major Cos
- Green Ice, Royal oak leaf
NOTES FOR CABBAGE

Variety choice comments:
Differing maturity dates for longer harvest
Color (green vs. red), leaf type (flat or savoyed), head size.

Cultural information/growing tips:
Classic biennial; may bolt if planted too early
Direct seed or transplant
Side-dress nitrogen once well established
Even watering in hot weather to minimize splitting
Expect to have to control pests listed below

Row spacing:
Minimum 18” to 24” between rows; 12” to 18” in-row

Pests/problems to watch for:
Cabbage aphid; imported cabbage worm, loopers; bolting

NOTES FOR SPRING BROCCOLI & CAULIFLOWER

Variety choice comments:
Differing maturity dates for longer harvest

Cultural information/growing tips:
Although biennials planting date not critical as harvest is immature flower parts
Direct seed or transplant
Do not stress cauliflower, otherwise they ‘button’
Side-dress nitrogen once well established
Expect to have to control pests listed below

Row spacing:
Minimum 18” to 24” between rows; 12” to 18” in-row

Pests/problems to watch for:
Cabbage aphid; imported cabbage worm, loopers; buttoning (cauliflower)
NOTES FOR BEETS & CHARD

Variety choice comments:
Color and shape of beets

Cultural information/growing tips:
Classic biennials; do not plant too early or they may bolt
Direct seed beets; do not transplant. Can direct seed or transplant chard
Sequential thin; use thinnings as 'greens'
Use floating row covers on beets to avoid virus transmission

Row spacing:
Between rows: chard 28” to 40”; beets 2 rows by 8” on 24” bed
In-row chard: 6” to 8”. In-row beets: sequential thin to about 4” to 6”.

Pests/problems to watch for:
Black bean aphids on chard; yellows & mosaic virus can be a problem in beets

NOTES FOR POTATOES

Variety choice comments:
Use 'certified' seed (virus free)
Color (white, red, yellow, etc. flesh; russeted)

Cultural information/growing tips:
Require relatively large area
Prefer cool weather, but not frost tolerant
Cut large 'seed' pieces to 2 or 3 'eyes'
Double dig area; use lots of compost (if available)
Hill up when about 12” tall
Keep foliage dry
Lift and store in dark when tops mature and die

Row spacing:
Typically 28” to 40” between single rows; 8” to 16” in-row

Pests/problems to watch for:
Normally none; late-blight if foliage gets wet
ONIONS (also shallots & garlic)

NOTES FOR ONIONS, GARLIC, SHALLOTS

Variety choice comments:
Day-length requirements/bolting tolerance
Taste, color, and intended use (immediate use or storage i.e. keeping qualities)

Cultural information/growing tips:
Onions are biennials that are prone to bolting if planted too early
Direct seed or transplant onions; seeding is cheaper and easier, also allows for green onions during thinning
Use sets for garlic and shallots; perennials.
Allow tops to collapse and dry before lifting for storage

Row spacing:
Onions: minimum 6" to 12" between rows; 3" to 5" in-row. Garlic and shallots add about 2" to 3".

Pests/problems to watch for:
Usually none; onion thrips can be a problem.

ONION, ETC. TIME-LINE & VARIETIES:

ONIONS

SEEDING

TRANSPLANTING

GROWING

HARVESTING

ONIONS

SHALLOTS/GARLIC

DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Miscellaneous

- Artichoke
- Asparagus
- Celery
- Rhubarb
- Radish
- Sweet potato

THE END