

Seed Saving
for
Community Food Security
Version 1.0

Seed Saving for Local Food Security

The Community Seed Bank

It makes sense to begin small scale home gardening and collaborative seed saving in advance of an emergency and to build a village/neighborhood/community seedbank of nonhybrid seed. That seed bank should be restocked annually. The reasons for this approach are several:

- 1) To ensure that there will be enough seed to enable a transition to self-sufficiency at a time when demand for nonhybrid seed will outstrip supply.
- 2) To adapt nonhybrid varieties to local conditions over several growing seasons, for optimal harvests.
- 3) To ensure the viability of seeds the way nature does, by allowing them to grow and reproduce new seed each growing season.

A sustainable village (or neighborhood) should master the process of collecting and saving nonhybrid seed each growing season from every crop it grows. Enough seed should be saved to plant the next year's crop and more. Seed will be needed for planting and replanting, for bartering, and in case a crop fails due to extreme weather, drought, fire or pillaging.

For some crops, saving seed is simple. For other crops, the procedure is more exacting and labor intensive. In a village or a neighborhood, it makes sense to collaborate and delegate in order to simplify the seed-saving process for each seed saver. One household may plant interplant a block of corn with runner beans, fence the plot to keep the deer out, and save bean and corn seed enough for a number of households. Another might specialize in saving seed for tomato varieties, along with borage and basil as companion plants to deter tomato pests. A

third might interplant onions, leeks and carrots and save seed for all three.

Crops that do not readily cross

These are "no worry" plants. They do not need spacing or other measures to maintain seed purity because they are self-pollinating. Examples are beans, tomatoes, peas, and lettuces. Their flowers have both main and female parts. (These are called "perfect flowers.") They do not depend on the wind or visiting bees to pollinate them. Because different varieties do not usually cross-pollinate, gardeners can grow various kinds of beans (runner beans are an exception) or peas or tomatoes. An occasional cross can be identified because the plant is different in some way from its parent. Seed from an "oddball" plant should not be saved with the rest. The oddball plant itself should be removed from the garden before it flowers.

Crops that cross

Many garden crops, however, readily cross pollinate with other members of their own plant family. Their flowers do not contain both male and female parts. (These are called "imperfect flowers.") Instead, these plants depend on insects or the breeze to carry pollen to them. Seed savers strive to keep cross-pollination from happening. In that way, the desirable characteristics of a particular variety will be maintained in next year's seed.

There are a variety of ways to protect related crops from cross pollinating:

1. Stagger planting times

Corn pollen is carried by the wind for considerable distances, such that one kind of corn readily crosses with another. In order to grow two different varieties of corn, gardeners stagger

planting times. An early maturing variety can be planted first, at the beginning of the growing season, and a later maturing variety can be planted two or three weeks after. If there are two different varieties in a field, however, some lingering pollen from the tassels of the first variety may pollinate neighboring plants of the second variety. (Most corn pollen falls to the ground within 50 feet or so of its source.) For that reason, it is best not to plant two types of corn side by side in long rows. Instead, they might be planted at opposite ends of the garden or at opposite ends of long rows. Seed should be gathered from stalks farthest from the other variety.

In order to stagger planting times successfully, pay careful attention to the maturity dates for each variety. It's best to use varieties with very different maturity dates to get the time interval needed.

2. Plant only one variety of a particular species prone to cross pollination.

In the village, people cannot simply plant what they like without regard to keeping seed stock pure. Instead the village needs to do some planning, preferably before buying seed. Given that spinach pollen can be carried for a mile, it is best to choose one locally adapted nonhybrid variety of spinach and have everyone in the village plant that variety. See the Appendix 2 on page 45 for more information about how to plan.

3. Maintain recommended isolation distances

Gardeners can isolate a single variety of a species from all others by a recommended distance, the plant's "isolation distance." The recommended distance is too far for bees or wind to carry pollen from one variety of a particular species to another. For plants with large isolation distances, this method simply is not practical. Someone across the neighborhood may be growing another member of the same species, or a wild variety may cross with a domesticated one, as Queen Anne's Lace crosses with carrots.

4. Protect plants from cross pollination by means of physical barriers. (See notes for each crop for details as to which method may be required.)

Bagging. Spun polyester cloth called Reemay or another lightweight fabric can be used to keep insects off of flower heads. Fashion a bag to enclose a flower head or tie a section of fabric around it. Secure the bottom of the fabric around the stem with a twist tie or string. To protect the stem from damage and from insects that might enter from below, wrap a bit of cotton around the stem before tying the bag closed around it.

Caging. To cage a planting of a single variety, use wood, wire, plastic pipe or metal to fashion a frame around the entire planting or row. Then cover the frame securely with spun polyester cloth or window screening. Reemay cloth will let in more light than window screening. In some cases, a plants can be wrapped in spun polyester cloth clipped together with clothespins.

Alternate Day Caging. If you grow two varieties that cross easily and require pollination by insects, then you can use alternate day caging. The principle is simple: build a cage for each variety. Remove the cage from one variety one day and the other variety the next. At all times, one variety is caged but the other is not. Continue alternate day caging until flowering for both varieties is completely over. You will not get quite as much seed as you would if insects had access to the plants full time, but your cabbage will not cross with your kale.

Keep in mind isolation distances, in any case. If your neighbors are growing crops that will cross with yours, alternate day caging is not a solution.

Hand pollination. Crops that are pollinated by insects or the wind can be protected from both and hand pollinated instead. Methods vary according to crop, so specifics are described in the Crop Charts that begin on page 7.

Introduction to seed saving

Save seed selectively, from the healthiest, most vigorous, productive plants of each variety. To enhance the general sturdiness and disease-resistance of a nonhybrid variety, save seed from plants that have not been babied. Taste is rightly a selective criteria. A gardener may break off the bottom of a carrot root from a carrot plant, wash the bit, have a taste, and then replant the plant to produce seed in its second year if its flavor passes muster.

Avoid saving seed from plants that bolt early, since bolting early is not a desirable trait.

Save seed not just from one or two plants of one variety but from as many healthy specimens as possible so that genetic diversity is preserved. It is that diversity that enables the crop to adapt to local or changing conditions. The Dancing Seeds collaborative suggests a process for improving a variety to better suit conditions in your area, whether you are aiming for better tolerance of cold or drought or improved disease resistance. They recommend ordering seed for the crop you wish to improve not just from one seed source but from several, so that you begin with a diverse gene pool. They advise planting many seeds and not just a few, so that you are likely to have a number of “best” specimens to save seed from. They suggest letting native wild plants grow nearby to attract pollinators and insect predators, but otherwise not “babying” the crop. Remove inferior plants before they flower. Save the best plants for seed, and the biggest, highest quality seeds from those plants.

Dry seeds thoroughly. When you think your seeds are dry, hit one with a hammer. If it shatters, you’ve dried the seeds enough, and they are ready to store.

Save several times the amount of seed you will need for the next planting. Otherwise, a crop failure or two can wipe out your supply.

Seed Saving Supplies

- A notebook for record keeping
- Envelopes
- Airtight containers such as glass jars
- Framed screens
- Two bowls or buckets
- A fan
- Spun polyester cloth such as Reemay
- Building materials for cages, if required
- Clothespins, ties or other fasteners

See the Crop Charts (pages 7-42) for notes on saving seed for each crop.

Storing seed

Most stored seeds stay viable longest when they are kept in dark, dry, cool, pest-free conditions. (Citrus seeds are an exception and should be planted as soon as possible.)

- Harvest seed only when that seed is fully mature. (See seed saving instructions for individual crops.)
- Clean and dry seeds thoroughly, saving the best, healthiest-looking seed.
- Save only seed that is true to type, not seed that looks as if it may have crossed.
- Store each type of seed in a labeled, sealable glass jar or canister or, for smaller quantities of seed, in a labeled envelope. If you use envelopes, obtain a glass jar or canister to keep the envelopes in. You want to keep pests out, and you want to create dry conditions.
- Keep careful records about the seeds you store. See Appendix 3 on page 46 for a printable labels you can fill out for each variety of seed you store.
- To keep the moisture content of the seeds low, add silica packets or powdered milk flakes to the jar before closing it tight. Either of these will absorb moisture.
- Kill bean weevils that could hatch out in your bean seed by freezing your jar of seed for 3 days. Most but not all kinds of seeds can be stored for a long time in the freezer. NOTE: Always leave the jar out of the freezer for a day before opening it. Otherwise, moisture will condense on the thawing seed. If that jar

is returned to the freezer, the seed will be killed by moisture freezing in its tissues.

- Seed should be stored in a cool, dark place where the temperature does not fluctuate much, but that doesn't have to be a refrigerator or freezer. A root cellar or cool basement or closet will work.

Store the seed you grow and grow the seed you store

Packaged properly for long-term storage, some types of seeds remain viable for years, though their germination rate is gradually reduced and some genetic diversity may be lost.

Despite this fact, there are compelling reasons to plant the crops you want to depend on every year and collect new seed.

1. This is nature's way and the best way to ensure that your seed is fresh.
2. Field testing crops in your area is essential. Some crops will grow and produce vigorously, and some will not, no matter how good they looked in the seed catalog. You need to know what crops you can depend on.
3. If you grow crops every year from seed you saved (the best of the best), you will adapt those crops to local conditions. Locally adapted seed is the most dependable seed of all.
4. If you grow crops annually and save seed from them, you master a body of knowledge and a set of skills potentially critical for survival. You do not want to learn by trial and error when life depends on your success.
5. The healthiest soil is built up over time using organic methods. Since good soil is essential for good crops, it is wise to expand gradually the areas you can use for your garden.

The special case of biennial plants

Some vegetables are biennials. This means two growing seasons are needed to obtain

seeds. Examples include beets, cabbages, carrots and celery. Saving seeds from biennials is a two-step process:

1. First you need to protect them over the winter. Hardy plants like leeks and parsnips you can leave in the ground and simply cover with a mulch of straw, leaves or grass. Tender plants (cabbage, carrots, beets and turnips), will need to be carefully dug up and kept in a cool and humid place - a root cellar, for example. Or make a temporary root cellar by digging a two or three foot wide trench up to four feet deep (below frost depth). Place a layer of mulch in the trench and add your vegetables. Put a deep layer of mulch on top of the vegetables and heap soil (from the trench digging) over this top mulch layer.
2. In the spring, carefully dig up your protected vegetables. Help them get a good start by potting them in good soil. After new green growth appears, you can transplant them to the garden to grow and produce seed in their second season.

Planning for Success

The planting plan for the village or larger community should ideally be done with seed saving in mind. Planners should take care to ensure that different varieties in the same plant family will not cross. Neighbors planting various varieties, hybrid and nonhybrid, willy nilly, will prove problematic for seed saving.

A community focused on transitioning to local food self-sufficiency can collaborate to map arable land, including that in neighborhoods, gauging distances required to isolate crop varieties that cross. Planners can create planting zones for crops that should be isolated from one another for easiest seed saving. See Appendix 2 on page 45 for a schematic model that illustrates the principles of separating varieties that would otherwise cross. Other ways to ensure that seed remains pure are explained in the pages that follow.

Recommended Reference

This document is a seed-saving primer. If possible, buy for your reference library Suzanne Ashworth's book *Seed to Seed: Seed Saving and Growing Techniques for Vegetable Gardeners*.

Printing a Hard Copy

Because disruptive events can affect the power grid and Internet access, it is prudent to keep a printed copy of this document.

Seed Sources

Selected U.S. sources for nonhybrid seed are listed in Appendix 1 on p. 43. Local seed savers may offer locally adapted varieties and a treasure trove of information about crops and how best to grow them where you are.

Adapting This Work

This document was written primarily with U.S. gardeners in mind, but regional versions and versions for other countries are valuable additions to shared knowledge. See page 48 for the terms of the Creative Commons License that governs appropriate use of this work.

Vegetable Crop Charts

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I. The Cucurbitaceae Family

Squash, Pumpkins, and Gourds

Genus - Cucurbita

Planning Notes: Squash varieties within the same species will cross and must be separated by 1/4-1/2 mile. There are four different species of squash. The simplest approach is to grow one variety within each species in order to avoid crossing, but your neighbors will have to choose the same varieties you do if that approach is to work.

Squash are good sources of potassium, Vitamin A, and beta-carotene. Winter squash are higher in carbohydrates than summer squashes. Pumpkin has more potassium than bananas do, while acorn squashes are good sources of fiber, potassium, and iron.

Recommended varieties of summer squash include Early Prolific Straightneck, Yellow Crookneck, and Dark Green Zucchini. For winter squash and pumpkins, consider Hubbard squash, Waltham Butternut squash, New England Pie pumpkin, Amish Pie pumpkin.

Planting Notes: Plant squash and pumpkins after the soil has warmed and the danger of frost has passed. Squash vines need room to ramble (usually about 6'). Traditionally, they are planted at the base of corn or in hills about 6' apart. To plant a hill, draw an 8" square in the soil with your finger. At each corner of the square, plant 2 squash seeds 1" deep. When the seeds come up, pinch off the weakest seedlings, leaving the 3-4 strong plants in the hill.

Seed Saving: To harvest seed from summer squash, let them ripen on the vine until their skin hardens and then three weeks more. Then cut them open to collect the seeds. Harvest seed from winter squashes and pumpkins when they are to be eaten. Rinse the seeds, pat them dry with a towel and then lay them out to dry. Seeds are dry enough for storage when you can break them in half.

If there are multiple varieties of the same species in your garden or within 1/4 - 1/2 mile of it, you will have to resort to **hand pollination** in order to collect good seed. This technique works only if you have time to devote yourself to carefully implementing it. You'll be playing the role of a bee and keeping real bees and other pollinators out of some of the flowers. First, you have to learn to tape flowers closed just before they would otherwise open the next day. Do this in the evening. Second, you have to pollinate female flowers with pollen from male flowers. You'll do this the next morning. Fortunately, it is easy to tell male and female flowers apart. Male flowers sit on a slender stalk. Female blossoms sit atop a little round squash-to-be (an ovary). To pollinate a female flower, cut a male flower a few inches down its stem, untape it, and remove its petals to reveal its anther. That would be the little spike with the pollen. Then untape the female flower and brush its inner parts (the stigma) with the male anther. Retape the female flower and tie a bit of colored yarn around it to show that the resulting squash fruit is to be harvested for pure seed.

Cucurbita maxima	Select only one from Banana, Buttercup, Hubbard, or Turban varieties of squash.
Curburbita mixta	Select only one from white- or green-striped Cushaw varieties or silver-seeded gourds
Cucurbita moschata	Select only one from Butternut, Cheese, or white Cushaw varieties.
Cucurbita pepo	Select only one from Acorn, Crookneck, Scallop, Pumpkin or Zucchini varieties. (Small decorative gourds also fall in this species and will cross with other varieties.)

Watermelon, Citron

Genus: *Citrullus*

Planning Notes: Varieties cross and must be separated by 1/2 mile. If neighboring gardeners are willing to cooperate, choose one kind of heirloom watermelon to grow. Otherwise, use hand pollination techniques described below.

Planting Notes: In the Northeast, start watermelons in the greenhouse in April and transplant them into the garden in early June. Elsewhere, plant watermelon seed in the garden once daytime temperatures reach 85° F (29° C). Plant in hills as you do squash: To plant a hill, draw an 8” square in the soil with your finger. At each corner of the square, plant 2 squash seeds 1” deep. When the seeds come up, pinch off the weakest seedlings, leaving the 3-4 strong plants in the hill.

Seed Saving: Gardeners can more easily tell when a watermelon is ripe than grocery store shoppers can. There is a little tendril that shoots out from the watermelon’s stem. When that tendril turns partly brown, the watermelon is ripe.

Assuming you do not have to worry about other varieties crossing with yours, saving watermelon seed is easy. Save seeds when a watermelon is eaten. Wash the seeds in slightly soapy water, using a mild dish detergent, then rinse and let them dry before storing them.

To prevent one watermelon variety from crossing with another, use the procedure for hand pollinating squash, pumpkins, and gourds (on the previous page). The key difference will be that watermelon flowers are smaller than squash flowers. The best female flowers to pollinate are the earliest ones, and pollination rates are higher if you pollinate each female flower using two different male flowers. Male flowers are ready to pollinate female flowers when their anthers are fuzzy with pollen.

Watermelon
citrullus lanatus

Select one variety of watermelon. (Citron is rarely grown in home gardens and is made into preserves rather than eaten fresh.)

Recommended varieties: Moon and Stars (25-40 lbs.), Golden Midget (3 lbs., an early variety that ripens in 65 days, rind turns golden yellow when fruit is ready for harvest), Small Shining Light (8 lbs., Russian variety for northern gardens and high altitudes), Black-tail Mountain (6-12 lbs., developed in Northern Idaho, grows well in hot climates, too, whether dry or humid), Georgia Rattlesnake (Southern favorite), Ali Baba (16-25 lbs., widely adapted, productive)

Melons and Cucumbers

Genus: Cucumis

Planning Notes: Melons cross, so once again, the easiest approach is to select only one variety, with buy-in from other gardeners in your neighborhood. Varieties cross and must be separated by 1/2 mile. Otherwise, use hand pollination techniques described below.

Planting Notes:

Melons - Plant **melons** in hills (as for watermelons) when ground has warmed, giving them about 4-6 feet for vines to sprawl, or start early indoors, 2-4 weeks before planting in the garden. Do not opt to start early if your growing season is long enough for a variety to mature because transplanting is something of a shock to melons, which quickly develop a long tap root. Northern growers can plant faster-maturing varieties, mulching with black plastic to warm the ground faster.

Cucumbers - Direct seed **cucumbers** in the sunny garden once the soil is warm (late spring, early summer). Cover seeds with 1/4 - 1/2" of soil and thin plants to 18 - 24."

Seed Saving:

Melons and vine peaches - Harvest fruit when it releases easily from the stem, and save seed when you enjoy a ripe fruit. (Wash seed in soapy water and dry before storing, as for watermelon.

Cucumbers - Do not save seed from plants that produce bitter cucumbers. Allow seed cucumbers to mature until they begin to soften and change color, usually to white or yellow or orange. Cut a fully mature cucumber from the vine and set it aside for about two weeks before slicing it to remove seeds. Scoop the seeds into a bowl, add water (equal in volume to the seedy mixture, and ferment the seeds as you would tomatoes, out of sunlight, for 1-3 days. Mold will form. Stir this stuff twice a day until the seeds sink and the seed casings float. Pour off the moldy mixture, rinse, the seeds and dry them on a cookie sheet.

Cantaloupe, honeydew, muskmelon Cucumis an-guria	Select only one muskmelon, cantaloupe, or honeydew variety. Recommended varieties include Hearts of Gold (Midwest), Amish Melon, Honey Rock, Minnesota Midget, Charentais, Hale's Best.
Cucumis melo	Mango melon, garden lemon, melon apple, and vine peach. Choose one.
Cucumbers Cucumis sa-tivus	Select one variety of cucumber or undertake the involved task of hand pollination. (See hand pollination techniques for squash, above.) Cucumbers often produce best in early summer and late summer but less well in midsummer, when the days are longest. Recommended varieties include Improved Long Green (pick early for pickles, later for cucumbers), True Lemon pepper (pickling or slicing, easy to digest), Double Yield (pickling) Early Fortune (pickling and slicing), Early Russian (pickling, early), Marketmore (slicing, good for northern climates, disease-resistant), Bush crop (small gardens), Spacemaster (disease-resistant dwarf).

II. The Leguminosae Family

Common Beans

Genus: *Phaseolus*

Planning Notes: Common beans are self-pollinating and seldom cross. Separation need only be minimal. Varieties include French bean, kidney bean, navy bean, pinto bean, haricot bean, field bean, snap bean, string bean, frijol, wax bean. Pick snap beans frequently to encourage production all through the growing season. Avoid growing two different varieties of *Phaseolus vulgaris* side by side and especially growing two types with white seed side by side, because crosses cannot be identified. Pull up any young plants with an appearance different from the rest before they flower.

Beans of all kinds provide essential fiber, protein, and vitamins and are truly a staple food.

Planting Notes: Plant in the garden after danger of frost has passed, .5 - 1" deep about 2" apart. Build a support for pole beans - a teepee or cage or trellis 5-7' high, or interplant them with corn to grow up the stalks.) For recommended varieties, see below.

Seed Saving: To save seed from beans or peas, let the pods dry on the vine. If frost looms before the pods are dry, pull up the entire plant, shake the dirt from its roots, and hang it in a cool, dry place. The seed is ready to shell out when the pods are brown, dry, and brittle.

Common beans, including snap beans, pole beans and dried beans

Phaseolus vulgaris

Recommended varieties:

Pole beans - White Half Runner, Kentucky Wonder, Cherokee Trail of Tears, Bountiful Stringless,

Bush beans - Contender, Blue Lake, Kentucky Wonder Bush, Cherokee Wax, Black Valentine, Provider (can be eaten a green bean or as a dry soup bean)

Beans to dry - Black Turtle (northern garden), Navy beans, October beans, Hutterite

Runner Beans

Genus: Phaseolus

Planning Notes: Select only one type of runner bean or separate different types. Runner beans will cross with other runner beans. If varieties are separated by less than 1/2 mile, bag blossoms before they open. Runner beans such as Dwarf Bees Scarlet Runner beans are grown for the beauty of their flowers but also bear edible beans that can be picked young or left to grow to the size of limas for shelling. They grow well where summers are cool - in the U.K, New England, Canada, and the Northwest. They can be grown in containers, with support for their vines.

Planting Notes: When temperatures regularly reach 65° F in spring and danger of frost has passed, plant runner beans 1" deep in loose soil, thinning plants to 6" apart. Support the growing vines on a trellis. Plants like sun but not hot summers.

Seed Saving: Separate varieties or bag blossoms before they open, then shake the bagged blossoms daily in order to pollinate.

Runner beans

Phaseolus
coccineus

Varieties include scarlet runner bean, Aztec half-runner bean (potato bean), white Dutch runner bean, Case knife bean, black runner bean.

Lima Beans

Genus: Phaseolus

Planning Notes: Choose only one type of lima or butter bean. Varieties in this group will cross with each other but not with other types of beans. See recommended varieties below.

Planting Notes: Plant in the garden after danger of frost has passed, .5 - 1" deep, thin to 6" apart in rows 36" apart.

Seed Saving: If varieties are separated by less than 1 mile, bag blossoms before they open, then shake the bagged blossoms daily in order to pollinate. To save seed, let the pods dry on the vine. Save seeds from plants that bore the early and vigorously. The seed is ready to shell out when the pods are brown, dry, and brittle.

Phaseolus
lunatus

Recommended varieties include Christmas Lima (a pole variety), Dixie Butterpea (bush), Fordhook Lima (bush), Florida Speckled (pole).

Garden Peas

Genus: *Pisum*

Planning Notes: Crossing is minimal if bees have a variety of attractive food sources around. Separate varieties by 50 feet. Peas may be planted as soon as the soil can be worked in the spring. They like cool weather, and in areas where the growing season is long, they may be planted in late summer or early fall for a fall crop.

Planting Notes: Plant peas 1/2 - 1" deep, 3 inches apart, in rows 24" apart. Provide trellises or other supports for climbing varieties.

Seed Saving: Save seeds from the most vigorous plants. Let pods dry on the vines or pick them while they are still slightly green and let them finish drying indoors. Shell out the dried peas to save for seed.

Garden Peas, snow peas, etc.

Pisum Sativum

Green Arrow, Amish Snap Pea, Sugar Daddy Snap pea, Dark Green Perfection (northern favorite)

Cowpeas and Mung Beans

Genus: *Vigna*

Planning Notes: Some crossing may occur if two varieties are grown side by side, so separate them within the garden by 50 feet. Cowpeas (also called field peas or Southern peas) and Mung beans make excellent cover crops that help to restore fertility to the soil. Heat-loving cowpeas and Mung beans are not grown in colder climates, such as the Northeast.

Planting Notes: Plant cow peas and mung beans when the weather has warmed to the mid 70°s F or higher. Thin to 6" apart.

Seed Saving: Let seed pods dry on the vine and shell out the seed.

Cowpeas
Vigna unguiculata

Varieties of cowpeas include cowpea, asparagus bean, crowder pea, black-eyed pea, China bean, field pea, red pea, Southern pea, yard-long bean. Recommended varieties include Pinkeye Purple Hull, White Acre, Zipper Cream, Big Red Ripper.

Mung beans Vigna radiata	Mung beans are most often eaten as nutritious sprouts. They grow best in sandy, loose soils and struggle in heavy clay soils.
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Soybeans

Genus: Glycine

Planning Notes: Soybeans seldom cross. If you grow more than one variety, separate varieties within the garden.

Seed Saving: To save seed, allow the pods to dry on the plants before shelling out the seeds. Be forewarned, those dry pods are hard and sharp. Consider wearing leather gloves to save your hands when you shell out the soybeans, or, if you are handy, devise a hand-operated winnower. (See Appendix ___ for an open source design.)

Planting Notes: Plant soybeans when the weather day temperatures reach the 70°s and 80°s F and the soil has warmed. Plant seeds 1/2" to 1" deep, 3" apart.

soybean Glycine max	Recommended Varieties: Jet Black, Agate, Manitoba Brown, Edible, Shirofumi
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Lentils

Genus: Lens culinaris

Planning Notes: Lentils' self-pollinating flowers do not tempt passing bees, so varieties will not cross. Lentils do not grow well in the Upper Midwest and are not reliable in the Northeast.

Seed Saving: Collect seed when the pods dry, but cup the pods in your hand gently as you pick them because they tend to shatter, scattering their seeds.

Planting Notes: When the soil has warmed and daytime temperatures have reached at least 65F, plant lentils 1/2" deep and thin plants to 4" to 6" apart. In hot climates, plant lentils where they will be sheltered by afternoon shade. In more moderate climates, plant them in full sun. The vines are self-supporting.

lentil lens culinaris	Recommended Varieties: Green French, Baby Blue, Black Beluga
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III. *The Amaryllidaceae Family*

Onions

Genus: *Allium*

Planning Notes: *Allium* flowers cannot self pollinate. Instead, flies and bees pollinate them, so seed-setting onions can readily cross with other onions. Separate varieties by 1 mile or use bagging and hand-pollination techniques.

Planting Notes: Grow onions from seed, starting them early indoors where the growing season is short, or from onion sets (baby onions). Plant onion seeds directly in the garden when temperatures reach 70° F or start them indoors. Plant them in full sun in the North or where they will receive afternoon shade where summers are hot. Thin plants to 3" apart or more apart, depending on the size the onions are expected to be.

Seed Saving:

Onion: Bulb onions that produce seed generally do so in their second growing season. Any seed produced during the first season should not be saved. Harvest onions after their tops begin to dry in the fall. Lay them out to dry for 10-12 days and then braid their foliage to hang them or cut off their tops for storage. Store them in a cool place such as a root cellar, where they will not freeze. Actually, onions store best in temperatures that are either warmer or cooler than room temperature.

Replant some second year onions that are true-to-type in spring so that these plants can produce seed. When onion flowers have bloomed and begin seed pods begin to dry, cut the flower stalks, letting them fall into a bag or bucket so that no seed is lost.

Bunching onions produce small onions, like shallots

Egyptian walking onions (*Proliferum* Group) multiply by setting bulbs on the tops of their stems. The bulbs grow heavy until that they bow the stems and "plant" themselves. Thus a stand of Egyptian walking onions will spread without help and should, in fact, be managed to prevent overcrowding. In the spring, the entire plant can be used like scallions, and in the summer the top-forming bulbs are used instead. The biggest "baby bulbs" can be saved to start plants the next year. In the fall, some can be planted in deep pots to supply onions for winter use.

<p>Onion Allium cepa</p>	<p>Long Red Florence (for fresh eating), Texas Early Grano (Vidalia-type onion, short keeper, grows well in the South, disease-resistant), Yellow of Parma (good keeper), Australian Brown (excellent for storage, strong flavor), Southport White Globe (good storage onion), Evergreen Hardy White Bunching (may be left in the ground in the South, multiply onions by dividing clumps), Yellow Ebenezer (good keeper, good for the South), New York Early (dependable, productive, medium-term keeper)</p>
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<h2>Leeks</h2> <p>Genus: Allium</p>	
<p>Planning Notes: Like onions, leek varieties will cross and should be separated by 1 mile. Alternatively, use alternate day caging or hand pollination, explained below.</p>	
<p>Planting Notes: Direct seed leeks in the garden at the appropriate time, which can vary from fall in hot climates to early spring in colder ones, or, in colder climates, start leeks indoors in late winter and plant them in the garden in early spring. Plant leeks in a 5" trench. If direct seeding, cover seeds with 1/4" - 1/2" of soil and keep the soil moist until seeds sprout. Fill the trench as the plants grow so that the soil forms a blanket to protect the leeks from freezing in winter.</p>	
<p>Seed Saving: Choose a single variety suited to the area or use alternate-day caging or hand pollination so that seed from different varieties can be saved. Leeks are biennials that do not produce seed until their second season. After the first season, leave them in the ground and simply cover them with a mulch of straw, leaves or grass, then clear away the mulch in spring.</p> <p>To hand pollinate second-year leeks, bag their immature flowers. Each morning un-bag a few flowers at a time and pollinate them using a camel hair brush to transfer pollen from one flower to another. Hand pollinate at least 10 flower heads for each type of leek for which seed is to be saved. Left to overwinter, leeks produce "leek pearls," side shoots that can be planted as sets, genetically identical to their parents. If two varieties get crossed, planting leek pearls is a good way to recover pure seed.</p>	
<p>Leek Allium ampeloprasum</p>	<p>Giant Musselburgh, American Flag, Carantan (hardy fall/winter variety), Prizetaker (extremely cold hardy), Scotland (overwinters well)</p>

Garlic

Genus: *Allium*

Planning Notes: Most garlic bought in stores is “softneck” garlic suitable for braiding and storage. Softneck garlic is best adapted to the south. Hardneck garlic likes colder winters and is raised successfully in the North. Hardneck rocambole, or “serpent garlic,” forms top setting bulbils on stiff stalks that grow in a loop and then straighten. Both the bulbils and the cloves can be planted in order to propagate new plants, but allowing the bulbils to form will divert energy that would otherwise go to developing the cloves below.

Planting Notes: Garlic is grown from cloves rather than seed. Plant garlic cloves in the fall, several weeks before first frost. In mild climates garlic will grow all through the winter. In northerly climates, mulch the garlic bed well, and plants will sprout in spring.

Seed Saving: Divide garlic bulbs in the fall in order to propagate new plants. Plant cloves 4” apart.

Garlic and Rocambole

Allium sativum

Recommended varieties: Silverwhite (softneck, stores up to 12 months), Mild French (softneck, excellent keeper for the South), Polish White or New York White (softneck good for northern gardens), Early Red Italian (softneck), Ajo Rojo (hardneck), German White or German Porcelain (hardneck, good for northern gardens), German Brown (strong flavor, stores well), Georgian Fire (a pleasantly hot, strong hardneck garlic, disease resistant), German Extra Hardy (hardneck, overwinters), Music (consistent producer, hardneck), Keeper (hardneck, stores 6-7 months)

Chives and Garlic Chives

Genus: *Allium*

Planning Notes: Garlic chives do not cross with common chives. Simply grow common chives and, if desired, one variety of garlic chives.

Planting Notes: Chives and garlic chives will reseed themselves. Garlic chives spread quickly and can overtake the garden. To control them, bag 10 flower heads for seed and cut the other blooms before they shed seed. Common chives reseed but do not take over.

Seed Saving: Bag selected flowers and collect seed when the flowers have dried. For garlic chives, cut other flowers before they drop their seed so that garlic chives do not spread where you do not want them to grow.

Common Chives

Allium schoenoprasum

Variations in height or flower color exist, but chives seeds are not offered by seed sellers in different named varieties. Chives are perennials, and they will not cross with other allium species (including garlic chives). In areas subject to cold winters, new plants volunteer from seed.

Garlic Chives (Chinese Chives)

Allium tuberosum

Garlic chives have a mild garlic flavor and flat leaves like miniature leeks. They do not cross with other alliums. There are several named varieties, including Forescate (red flower) and Corsica (white flower).

IV. *The Brassicaceae Family*

Broccoli, brussels sprouts, cabbage, cauliflower, collards, kale

Genus: Brassica

Planning Notes: Varieties belonging to this species pose special challenges for seed savers. They all can cross with each other, Their perfect flowers still require insects to pollinate them. Furthermore, many varieties are self-incompatible. They must have pollen from another plant of the same kind in order to produce. Seed must be saved from multiple plants of one type. Six plants are a minimum, more would be better. A community that plans to save seed for any of the Brassicas must plan who grows what and where.

Seed for these biennial crops is produced in the second year, so in cold climates plants must be dug up and over-wintered indoors, potted in sand. For best seed production, do not harvest heads from plants intended for seed.

The Brassicas like loose soil high in organic matter (as opposed to unenriched clay) and are heavy feeders. They do not like acidic soil, and they need a considerable amount of nitrogen.

The nutritional value of the Brassicas makes them worth growing despite the challenges involved in growing them and saving seed. Broccoli florets and greens are loaded with potassium, calcium, Vitamin C, protein, and fiber, while Kale wins hands down as the most nutritious vegetable of all, with antioxidants and loads of vitamins A,C, and K, protein, and fiber.

Floating row covers can help keep insect pests away.

Seed savers can

- 1) Choose a favorite variety to grow within a 1 mile radius and skip the rest. Note what grows well in the area. In the South, for instance, gardeners grow collards more often than broccoli.
- 2) Choose two varieties and use alternate day caging, assuming other area gardeners are collaborating.
- 3) Cage all varieties grown and introduce pollinators such as flies or bees.
- 4) Collaborate with other gardeners to separate varieties within this species by 1 mile and then trade the fruits of the harvest.

Planting Notes:

Broccoli may be started in the greenhouse 8 weeks before the last frost or in the garden as the soil warms. In the garden, plant seeds 1/4" - 1/2" deep in an area where they will receive full sun. Thin plants to 8" apart.

Brussels sprouts - Brussels sprouts grow best when the days are sunny and the nights are cool, even with light frosts. In many areas they are grown as a fall crop, and they require 90 days to mature.

Cauliflower is often started indoors and then transplanted. Plant seeds 1/2" deep. Transplant plants 24" apart in the garden. Cauliflower is the most difficult of the Brassicas to grow, and too much sun, heat or nitrogen can affect the quality of the heads.

Cabbages grow best where summers are mild. They should be planted in spring and can be direct seeded or started in a greenhouse for transplanting. In areas where they can over-winter, they are often started in the summer or fall. They survive the mild winters as long as they have not yet formed heads. Space cabbage plants to 24" - 36" apart to give them room to grow.

Collard seeds sprout as soon as soil temperatures reach 45°F in spring, or they may be started indoors and transplanted into the garden. Plant seed 1/4" deep and thin plants to 18" apart. Collards have fewer problems with insect pests than other Brassicas do.

Kale maybe sown in the greenhouse 8 weeks before last frost. Plant seeds 1/4" deep and transplant young plants into the garden 24" apart. Kale tolerates light frosts. In the South, Kale is grown as a fall crop because hot summer days make the leaves bitter. Harvest after first frost.

Seed Saving:

Where winters are cold, carefully dig seed plants up in the fall and pot them in sand indoors or in a root cellar/trench for the winter, so that they will stay quite cool but not freeze. Replant them in the garden in early spring. When they have bolted, allow pods to dry and turn brown on the plant before harvesting them. Some dried pods shatter easily, while others have to be broken.

<p>Broccoli, Brussels sprouts, cabbage, cauliflower, collards, kale</p> <p>Brassica oleracea</p>	<p>Recommended varieties:</p> <p>Broccoli - Romanesco (for northern gardens), De Cicco (early, productive), Atlantic</p> <p>Brussels sprouts - Catskill, Long Island Improved</p> <p>Cabbage - Copenhagen Market (6"-8" heads), Early Jersey Wakefield (7" heads, early, often grown for a summer crop), Late Flat Dutch and Mammoth Red Rock (both good keepers)</p> <p>Cauliflower - Early Snowball, Self Blanching</p> <p>Collards - Morris Heading (slow to bolt), Georgia Southern (tolerates heat, frost hardy), Vates (winter hardy in Southern states).</p> <p>Kale - Dwarf Blue (Northern states), Early Siberian (Southern states), Winter Red (disease resistant)</p>
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Turnip, broccoli raab, Chinese cabbage, Chinese mustard

Genus: Brassica

Planning Notes: Varieties belonging to this species cross, as with other members of the Brassicaceae family. Their perfect flowers still require insects to pollinate them. Furthermore, many varieties are self-incompatible and must have pollen from another plant of the same kind in order to produce. Grow at least six plants for seed production. While turnips are grown for both their leaves and their roots, broccoli raab is grown for its edible buds and leaves, which are used for salads, steamed, and for their pronounced flavor in Italian dishes (described as bitter, spicy, peppery, and mustardlike). Turnips are high in potassium, vitamin C and vitamin K.

Seed savers can

- 1) Choose a favorite variety and skip the rest.
- 2) Choose two varieties and use alternate day caging.
- 3) Cage all varieties grown and introduce pollinators such as flies or bees.
- 4) Collaborate with other gardeners to separate varieties within this species by 1 mile and then trade the fruits of the harvest.

Planting Notes: Plant turnip and broccoli raab seeds 1/4" - 1/2" deep and thin plants to 6" apart.	
Seed Saving: Chinese cabbage and Chinese mustard are biennials. Seed should be collected the second year. Turnips and broccoli raab are biennials, too, but some early turnip varieties may produce seed in a single season. Seeds turn brown on their seed stalks as they mature and begin to pop open, beginning with the pods lowest on the stalk. Harvest seed when the lower pods have begun to pop open and the others are mostly brown and dry.	
turnip, broccoli raab, Chinese cabbage, Chinese mustard	Recommended varieties: Turnip - Purple Top White Globe (matures in 45-65 days, keeps well), Golden Ball, White Egg (42 days) Broccoli Raab - Zamboni, Rapini
Brassica rapa	

<h1>Radish</h1> <h2>Genus: Raphanus</h2>	
Planning Notes: Radishes will cross, even with wild radishes. Choose one variety that produces well locally. Different varieties must be separated by 1/2 mile or caged with ReMay or screening.	
Planting Notes: Radishes can be sown in the garden beginning in early spring, as soon as the soil can be worked. For a continual harvest, plant more radishes every 3-4 weeks throughout the spring and summer. Plant seeds 1" apart in rows 12" apart and cover the seeds to a depth of 1/2."	
Seed Saving: Leave some radishes in the ground to produce seeds on their 3' stalks. Seeds should be harvested when stalks and pods are dry. Do not save seed from the plants that bolt first. The pods are hard and may have to be broken with a measured blow from a hammer.	
Radish Raphanus sativus	Recommended Varieties: Cherry Bell, Early Scarlet Globe, Purple Plum (mild), French Breakfast (pungent)

<h2>Mustard greens, Indian mustard, leaf mustard</h2> <p>Genus: Brassica</p>	
<p>Planning Notes: Varieties will cross and must be either separated or caged. They are, however, self-compatible and self-pollinating. Floating row covers keep flea beetles off them. The easiest approach is to grow only one variety. Separate varieties by 1/2 mile. Floating row covers can keep pests such as flea beetles away from crops.</p>	
<p>Planting Notes: When the days have warmed to the 70°s F, sow mustard seed in the garden and cover seeds to a depth of 1/4." Thin plants to 8" apart. Pick leaves young for tenderer, milder greens.</p>	
<p>Seed Saving: Seed pods shatter easily.</p>	
<p>mustard greens</p> <p>Brassica juncea</p>	<p>Recommended varieties: Southern Giant Curled (best for the South), Green Wave (hot, spicy), Tendergreen (mild).</p>

<h2>Rutabaga (Swede turnip), Siberian kale, rape</h2> <p>Genus: Brassica</p>	
<p>Planning Notes: Rutabagas do not grow well in places where summer temperatures regularly exceed 75 degrees. Rutabagas are grown for their turnip-like roots and are enjoyed in soups and stews.</p> <p>Rape is grown for the oil that can be extracted from its seeds.</p> <p>Though members of this family are self-fertile, insects will cross-pollinate them. Choose one variety or separate varieties by 1 mile.</p>	
<p>Planting Notes: Rutabaga is direct seeded in late spring, when temperatures range from 50-70 degrees, at 1/2" deep. Thin seedlings to 6" - 8."</p>	

Seed Saving: Rutabagas are biennials, producing seed during their second year. They can be left in the ground over the winter if they are covered with a heavy mulch, or in areas with cold winters, they can be dug up and stored for up to four months in sawdust or moss in a cool place. Trim the greenery to two inches. Rutabaga seeds are borne atop tall seed stalks. The seed pods are mature when they turn tan and dry. Collect them by hand beginning with lower seed pods and working up as the pods dry, but before they shatter. Or cut the stalks when most of the pods are dry. Seed pods shatter easily.

**rutabaga
(Swede turnip),
Siberian kale,
rape**

Brassica napas

Recommended varieties:

Rutabaga: American Purple Top, Laurentain, Helenor

V. *The Solanaceae Family*

Potato

Genus: Solanum

Planning Notes: Multiple varieties may be grown. Potatoes are not reproduced from seeds because every seed would produce an essentially new variety. Instead, new plants are grown from whole potatoes or from potatoes cut up, each piece containing at least one “eye” or bud. The catch is that viral diseases and root knot nematodes are often passed on, jeopardizing the next crop.

There is, however, a way to propagate plants that do not carry disease, described by Suzanne Ashworth, in *Seed to Seed*. Plant potatoes in sterile potting soil. When shoots are 6-8” tall, take cuttings at least 2” from the soil’s surface, taking care that no leaves are touching the soil. Root the new cuttings in sterile potting soil that has never been used and burn the soil and potatoes that you started with.

Potatoes do not like hot weather. In warmer climates they are grown as fall and even winter crops.

Planting Notes: Potatoes like soil worked to a depth of 10” and supplemented with organic matter, but not composted manure. Plant potatoes while weather is still cool in spring, but not more than 2 weeks before last frost, since plants require that long to emerge from the ground. Several days before planting, set seed potatoes in a tray in a sunny window to sprout. Small seed potatoes can be planted whole, but larger seed potatoes can be cut into pieces. Each piece should have 2-3 “eyes,” or buds. When sprouts are no more than 1” high, plant seed potatoes 2” to 4” deep in a furrow. Hill soil or straw up around plants as they grow. The mulch method will not work well if you have problems with slugs or mice. Potatoes are heavy feeders.

Potatoes may be planted in rows or in pots or even cages of small gauge wire or old tires if growing space is at a premium. Potatoes in raised beds, cages, pots, and tires will need to be watered more often than potatoes in the ground. Potatoes do not like temperatures above 90° F, so plants will languish in hot weather.

Seed Saving: Potatoes can be dug up in late fall before the ground freezes. Shake the dirt off and dry the potatoes for a couple of days before storing them. Small potatoes can be saved for seed, while larger ones can be stored for eating. Store potatoes, packed in straw or shavings, in a cool place, where mice cannot get at them. A potato that has begun to shrivel a little and is “springy” to the touch is still good for eating or for seed.

<p>potato Solanum tuberosum</p>	<p>Recommended varieties: Kennebec (a good baking potato for the South, widely adapted, stores well, blight resistant), Yukon Gold (stores well), La Rouge, Red LaSoda, Goldrush, Norland, Superior, Red Pontiac (drought tolerant), German Butterball,</p>
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Tomato

Genus: Lycopersicon

Planning Notes: Multiple varieties may be grown. Most modern varieties, except perhaps the beefsteak types, will not cross because of the shape of their flower.

Planting Notes: Six weeks before last frost, sow tomato seeds indoors in pots, covering seeds with 1/4” of soil. Transplant seedlings into the garden 24” apart when the weather has warmed and the danger of frost has passed.

Seed Saving: Harvest tomatoes when ripe. Slice the fruit in half across the middle to expose the seed cavity and scoop out seeds and the gel that coats them. Soak the gel-coated seeds from a single variety in water for several days until there is a coating of mold and a swampy odor. The fermentation process destroys some tomato diseases. Add more water, then pour off the mold and the seeds that float. The seeds that remain at the bottom are the good ones. Rinse several more times on a screen and then dry on a coffee filter. (Hint: seed don't stick to coffee filters they way they do to paper towels, so coffee filters are a good investment for seed savers.)

tomato

Lycopersicon
lycopersicum

Recommended varieties: Amish Paste, Brandywine, Rutgers, Italian Heirloom, Cherokee Purple, Cherry Roma, Crnkovic Yugoslavian (good for canning), Moonglow

Eggplant

Genus: Solanum

Planning Notes: Eggplants are not annuals but tender perennials. They can be taken inside for the winter and set out again in spring. Grow only one variety, separate varieties by 50 feet if you grow more than one, or cage plants before flea beetles appear. Grow at least six plants of one variety for seed saving.

Planting Notes: Six weeks before last frost, plant seedlings 1/4" deep in pots indoors, then transplant outdoors 24" apart when the weather is warm.

Seed Saving: To save eggplant seed, let some fruits over mature, until they are dull and hard. They will turn brown or yellow.

Grate the bottom part of the eggplant to expose the seed. Put the gratings into a bowl and fill the bowl 2/3 full with water. With your hand, squeeze the gratings so that the good seeds work loose and sink to the bottom of the bowl.

eggplant

Solanum
melongena

Recommended varieties: Casper (white), Diamond, Florida High Bush, Listada de Gandia (reliable, heavy producer), Rosa Bianca

Peppers

Genus: *Capsicum*

Planning Notes: Peppers do cross with each other. If hot peppers cross with sweet ones, the resulting offspring will tend to be hot. Cage each variety of peppers from which seed will be saved or bag some blossoms before they open. Remay row covering cloth, bridal veil fabric, or window screens work well for caging. Alternatively, separate varieties by 500 feet.

In areas prone to frost, peppers may be dug up and brought into a greenhouse for the winter.

Planting Notes: Pepper seeds germinate when soil temperatures near 80° F, and nighttime temperatures are no longer dropping below 50°F. They may be started indoors 8 weeks before transplanting, using gentle bottom heat.

Seed Saving: Save seed from fully ripe, healthy peppers. As peppers ripen, they will turn red, orange, or black. Slice the pepper and scrape the seeds from the core into a bowl. Wash seeds and dry them in a dish or on a cookie sheet, out of direct sunlight. Seeds are dry enough if they crack in half when pinched into a fold. If a seed bends instead of breaks, dry the seeds further before storing.

**sweet and
chili pep-
pers**

*Capsicum
annum*

C. annum includes bell peppers and hot peppers.

Recommended varieties: Aji Cristal (for salsa), Alma Paprika (for paprika), Ancho Gigantea (Mexican recipes), Bull Nose Large Bell, Buran (sweet), Bulgarian Carrot (hot), Chervena Chushka (sweet), Garden Sunshine (prolific, sweet, dependable), Fatilii (very hot)

VI. The Convolvulaceae Family

<h1 style="margin: 0;">Sweet Potatoes</h1> <h2 style="margin: 0;">Genus: Ipomoea</h2>	
<p>Planning Notes: Sweet potatoes can be grown in areas with a growing season of at least four months. In northern areas, cover soil where they will be planted with black plastic for several weeks to warm the soil. Sweet potatoes like sandy soil but can be grown even in heavy clay. Soil should be loosened to a depth of 10.” Order starter plants or start your own from purchased organic sweet potatoes. (Organic sweet potatoes are more likely to sprout.)</p> <p>Sweet potatoes are, for non-diabetics, an excellent food. They provide fiber, antioxidants, beta carotene, and Vitamin A. Their skin contains many nutrients and much of their fiber, so eat the skin as well as the flesh of the sweet potato.</p>	
<p>Planting Notes: If you are growing your own sweet potato sprouts to plant, buy organic sweet potatoes during midwinter and let them sit in your pantry until they sprout. When they do, set the end without the sprout(s) in water in a jar. Two weeks after last frost, cut the slips, or sprouts, from the sweet potatoes with a sharp knife and plant them in potting soil in small pots or planting cells for seedlings. Let them grow roots for two weeks or so, and then plant the slips in the garden 12” apart where they will have space to spread their 8’ vines without interfering with other crops. Be sure that the vines receive 1” of water per week, but do not water them during the last 3-4 weeks before harvest.</p>	
<p>Seed Saving: Harvest tubers before first frost kills the vines in the fall. Tubers from frost-damaged vines may not store well.</p>	
<p>sweet potatoes</p> <p>Ipomoea batatas</p>	<p>Recommended varieties:</p> <p>Beauregard (heaviest yielding variety, doesn’t crack open), Jewell (good yield, excellent keeper), Vardeman (small space bush type, good for smaller gardens)</p>

VII. *The Chenopodiaceae Family*

Beets, Swiss Chard

Genus: Beta

Planning Notes: Beets are cultivated for both their greens and for their roots. They promote heart health and are loaded with potassium. Their greens are high in calcium, iron, and vitamins A and C. Table beets are small, but sugar beets weigh 8-15 pounds. Mangel beets are large beets grown for forage. They make a good feed supplement.

Swiss chard, on the other hand, is grown for its greens rather than an edible root. It is also high in potassium, calcium, Vitamins A and C, along with beta-carotene and other nutrients protective for the eyes.

The light pollen of beets can travel miles on the wind. Bag seed stalks to prevent crossing or separate beet varieties by 2-5 miles. Chard varieties should be separated from each other by 1/2 mile.

Planting Notes: Plant beets in the spring. At the end of the first year, dig up the beets, being careful not to bruise or cut them. Trim the roots to 6" and the greens to 2" and pack the roots in damp sand or sawdust, covering the green tops. Replant the best roots the following spring so that the second-year plants can set seed.

Sow chard seeds in rows 24" wide in early spring, when soil temperature has reached 40°F. Cover seeds 1/2" deep and thin growing plants to 12" apart. Chard can be dug up and be brought indoors for the winter or, if winters are not too cold, mulched heavily. If chard is to be over-wintered indoors, trim the leaves off to 2" and pack the roots in sawdust or sand in a root cellar or other cool place until planting time in spring.

Seed Saving: Bag beet or chard seed stalks to keep seed pure. Since beets and chard are biennial, they will not produce seed until their second year. Cut the stalks when most of the seeds are mature, put them into a bag, and thresh them by jogging in place on the bag. Chaff can be removed by winnowing. Fused, flower-like clusters hold several seed each. These clusters can be broken apart - roll them with a rolling pin. Use enough pressure to crack the clusters but not to crush the seeds. Store seed in a dry, dark location.

<p>garden beet, sugar beet, mangel and Swiss chard</p> <p>Beta vulgaris</p>	<p>Recommended varieties:</p> <p>Beets: Bull's Blood (tender, mild), Chiogga, Detroit Dark Red (good keeper), Albino (white, no stains!), Yellow Intermediate Mangel (chard-like greens, beet up to 10 lbs., milder than red beets)</p> <p>Swiss Chard: Rainbow (actually different varieties of different colors, will cross), Fordhook Giant, Rhubarb</p>
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<h1>Spinach</h1> <h2>Genus: Spinacia</h2>	
<p>Planning Notes: Spinach pollen is very light and can travel for miles. Spun polyester fabric, rather than mesh screen, can contain the pollen best. Since the separation distance for different varieties is 5 miles, caging is the only realistic option for seed savers.</p> <p>Spinash is a runner up to kale in terms of its nutritional value. It is packed with vitamins A, C, K, folic acid, calcium, flavanoids, and antioxidants.</p> <p>Too much fertilizer high in nitrates can actually make spinach toxic, so avoid fertilizing heavily with ammonia-based fertilizers.</p>	
<p>Planting Notes: Plant spinach in the early spring or the late fall, in sun or light shade, when temperatures range from 55-70 degrees F. Cover seed with 1/2" of soil and thin plants to 3" apart. In the summer, when the days are long, spinach will quickly go to seed and the leaves will lose their flavor - this is called "bolting." Don't save seed from the plants that bolt first. Plant spinach closely in wide beds, then cage an entire bed. Spinach plants are male or female, and a closely planted wide bed is the best way to ensure that both sexes are represented in adequate numbers.</p>	
<p>Seed Saving: Bagging seed stalks, as described above for beets and chard, is the best way to collect spinach seed.</p>	
<p>Spinach</p> <p>Spinacia ol- eracea</p>	<p>Recommended varieties: America (slow bolting, head, drought resistant), Red Malabar, Bloomsdale</p>

Quinoa

Chenopodium

Planning Notes: Quinoa is seed (often loosely termed a grain) native to the Andes. Varieties from the southern Andes are successfully adapting to some regions in the U.S but will not grow well in areas where summer temperatures top 95 degrees. The leaves of the quinoa plant are prepared like spinach, and the seeds can be cooked much like rice, ground into flour, or added to soups or pilaf. Quinoa seed is covered with a bitter coating and much be soaked and washed in several changes of water to get rid of that coating.

Quinoa is high in complete protein, i.e., its protein includes all nine essential amino acids, with especially high levels of lysine. It also contains high levels of manganese, magnesium, and iron. Nutritionally speaking, it has been compared to dried whole milk.

Cross pollination between quinoa varieties is limited but does occur at rates between 10 and 15 %.

Planting Notes: In the Northeast, quinoa can be started in a greenhouse in early spring or direct-seeded in the garden in mid-May. Quinoa can handle light frosts but not temperatures lower than 20 degrees F. In other areas where it can be grown, quinoa can be direct seeded in spring. Thin plants to 8"-12." Quinoa grows in full sun and prefers average water but is drought tolerant.

Seed Saving: The seedheads need to cure after maturing. Some people bag them with a paper bag to collect the seed as it drops, while others cut the seed stalks and hang them upside down in a dry place over a tarp so that the fallen seed can be collected.

<p>Quinoa</p> <p>Chenopodium quinoa</p>	<p>Recommended varieties: Dave (short season variety can be grown at any elevation), Faro Quinoa (a sea-level variety from Chile), Brightest Brilliant (ornamental as well as edible), Temuco (best for maritime climates)</p>
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VIII. The Compositae Family

Lettuces

Genus: *Lactuca*

Planning Notes: The lettuces include head, butterhead, romaine, leaf, and Latin types. The long leaves of Latin lettuce form a loose head. Celtuce, or asparagus lettuce, is grown for its stem as well as its leaf.

Lettuces do not cross readily, but minimal crossing may occur if varieties are grown right next to each other. Separate varieties by at least 25 feet.

Planting Notes: Sow lettuces in spring, covering seeds with 1/4" of soil, when temperatures are 60-70° F or start them early in a greenhouse. Plant lettuce in full sun in cooler climates, or where lettuce will find relief from hot summer sun in a patch of afternoon shade. Thin plants to 4"-8" apart.

Seed Saving: Lettuce is an annual that sends up its seed stalk as summer days lengthen. However, the seed stalks of head lettuces sometimes get "stuck" trying to grow up out of the head. Some gardeners slit head intended for seed halfway open with a knife; others peel the leaves away until the stalk is revealed.

Lettuce seeds ripen for harvest 12-24 days after flowers have faded. Not all will ripen at once, so each day a seed saver will shake the seeds from the stalks into a grocery bag clearly labeled with the correct variety. What falls into the bag will be about half seed and half chaff. The seed is about the weight of the chaff, so winnowing is not a good method of separating one from the other. Instead, sort the seed using a screen. The weave should be a little too small for the seed to pass through. Gently rubbing the seed and chaff together on the screen will crumble the chaff through the screen, leaving the seed behind.

Lettuce, celtuce

Lactuca sativa

Recommended varieties: Amish Deer Tongue (sharp flavor), Bronze Arrowhead (leaf, slow to bolt), Forellenschuss, Green Oakleaf (never bitter, even in hot weather), Pablo (loose heads, slow to bolt), Grandpa Admire's (loose heads, mild, slow to bolt, handles extreme heat), Red Iceberg (large tight heads), Slobolt, Sunset, Tango, Tennis Ball, Webb's Wonderful (good for the South), Yugoslavian Red Butterhead (large, loose butterhead variety).

Jerusalem Artichokes (Sunchokes)

Genus: *Helianthus*

Planning Notes: Jerusalem artichokes, or sunchokes, are grown for their knobby edible roots. Some varieties have sunny yellow flowers. Once established in an area, they are hard to extricate, for they will grow from any piece of an unharvested root. These plants are better adapted to the northern 2/3 of the U.S. than to the South.

Raw, sunchokes taste something like water chestnuts, and they can be cooked like potatoes. They are a good alternative to potatoes for diabetics, because their carbohydrate storage, at harvest, is mostly in the form of inulin rather than starch. Some people find that they cause indigestion, however, so it is a good idea to experiment with that fact in mind.

Planting Notes: Plant tubers 3-4" deep where you would like them to grow forever and 12" - 18" apart.

Seed Saving: Sunchokes are propagated from tubers cut up and generally not from seed. In most places, sunchokes can stay in the ground for the winter, but in very cold areas, they can be dug up and stored indoors in a cool, humid place for up to two months. (Damp sand is ideal.) Unless kept in damp conditions, they tend to shrivel.

**Jerusalem
Artichokes
(Sunchokes)**

*Helianthus
tuberosus*

Recommended varieties: Mammoth French White, Columbia, Stampede, Fuseau (long straight white tubers, not knobby - translation, easier to clean), Red Fusea (early)

Sunflower

Genus: *Helianthus*

Planning Notes: Sunflowers are grown for their seed and for the oil that their seeds can supply. Their stalks can be bean poles, and their new leaves and flower petals can be prepared as vegetables, as the Native Americans used them. Sunflower varieties cross with one another, even at great distances. Varieties have to be separated by 1/2 - 3 miles to prevent crossing. Hand pollination is the alternative.

Planting Notes: Direct seed sunflowers in the garden, covering seeds 1/2-1" deep in late spring or early summer, when temperatures reach 75 degrees F. Thin plants to 12-18," depending on the size they will eventually reach.

Seed Saving: Since it is impossible to ensure that your sunflower patch is miles from anybody else's, use hand pollination techniques to collect pure seed for a particular variety. Bag the heads of two plants growing next to each other before the florets open. Then, for 10 days in a row, unbag the flower heads once a day and rub the face of a flower head from one plant against the face of a flower head from the plant next to it.

Sunflower
Helianthus
annus

Recommended varieties: Arikara, Velvet Queen, Mammoth or Russian Mammoth, Black Hopi Dye, Tarhumara White Shelled

IX. The Umbelliferae Family

Celery, celeriac

Genus: Apium

Planning Notes: Celeriac can be grown wherever other root crops thrive, but celery needs cool weather and must be started in a greenhouse in areas with spring frosts, transplanted 12" apart in the garden when they are 3-5" tall, and then harvested before the weather gets hot. Both celery and celeriac are biennials and grow best in well-drained soil rich with organic matter. Celery is not grown in the Mid-Atlantic or the Southwest.

Planting Notes: Two months before last frost, start celery or celeriac seeds indoors, covering them with 1/8" of soil. Germination can take as long as 3 weeks. Transplant plants outside, 6" to 8" apart, when the soil has warmed and the danger of frost has passed, and keep plants well watered during the growing season.

Seed Saving: In cold climates, celery and celeriac can be dug up and overwintered after their first season in moist sand, soil, or sawdust, and stored in a *damp* cellar. Care must be taken that roots do not dry out. Celeriac is best harvested for eating when it is about the size of a baseball.

Seed can be harvested during the second growing season.

Flowers, though perfect, cannot self-pollinate and are pollinated by insects. Members of this family will cross with each other. Since varieties would have to be separated from each other and from their wild cousins by 3 miles to prevent crossing, hand pollination, though time-consuming, is the only reliable way to save seed. For each variety to be saved, bag 10 flower clusters (called umbrels) before any of their flowers open. Tie a string at the bottom of each bag. Each morning for the next 2-4 weeks unbag a few flower clusters at a time (no more than you can keep insect-free), and use a clean, soft camel hair paintbrush to brush the flower heads on one plant and then on another, moving back and forth between flower heads of different plants at least twice. Rebag the flower heads before moving on to the next group. Use a different brush for each variety. If you don't have a brush, rub flowers lightly with the palm of your hand, moving in circles. You don't want to rub hard enough to damage the plant; you do want your hand streaked with yellow pollen. Wash your hands thoroughly after pollinating each variety. Harvest the umbrels as they dry.

Celery, celeriac

apium
graveolens

Recommended varieties:

Celeriac - Giant Prague

Celery - Golden Pascal, Golden Self-Blanching, Tall Utah, Tendercrisp

Carrot

Genus: Daucus

Planning Notes: Carrots varieties can cross with each other and with wild relatives such as Queen Anne's lace and fennel. They produce seed during their second growing season.

Planting Notes: In early spring, when the soil can be worked, so carrot seeds 1/4" deep and pat soil firmly down on the seeds. Keep the soil moist until the seeds germinate. Thin growing plants to 1" - 4" apart, depending on how big the mature carrots are expected to become.

Seed Saving: Carrots are biennials producing seed in the second season. After the first season, carefully dig up a number of the best carrots and keep in them a cool and humid place - a root cellar or trench. Replant them in spring.

Carrot varieties have to be separated from other members of the entire Umbelliferae family by 1/2 - 3 miles to prevent crossing. Since this measure is impractical, cage carrot plants (see page 3) during their second year in order to collect true seed. If flowers are in contact with the caging material, crossing can occur. Pollinate flowers by hand each morning for 2-4 weeks as they bloom. Use a clean, soft camel-hair paintbrush to brush the flower heads on one plant and then on another, moving back and forth between flower heads of different plants at least twice. If you don't have a brush, rub flowers lightly with the palm of your hand, moving in circles. You don't want to rub hard enough to damage the plant; you do want your hand streaked with yellow pollen. Replace the cage. Wash your hands thoroughly after pollinating each variety. Harvest the umbrels as they dry.

<p>Carrot</p> <p>Daucus ca- rota</p>	<p>Recommended varieties:</p> <p>If you have heavy clay soils, choose a short variety, such as Danvers Half-long, Chantenay Red Core. Other notable heirloom varieties include Scarlet Nantes, Oxheart, and St. Valery.</p>
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Parsnip

Genus: Pastinaca

Planning Notes: Parsnips were much more widely grown before potatoes gained popularity. They like soils that are light and rich in organic matter (not clay) to a depth of 12 inches or more. Parsnip varieties can cross with each other and with wild parsnips (or, more accurately, parsnips gone wild). Use hand pollination techniques in order to save pure seed.

In all but the coldest climates, parsnips are hardy and can overwinter in the ground. Their flavor becomes milder and sweeter once freezing temperatures have arrived. In the coldest climates, they should be taken up and stored as carrots are, with foliage trimmed back to 2".

The juice from the leaves and stems can cause rashes, so wear long sleeves and gloves when handling the plants and keep your hands away from your face. Water parsnips regularly during dry periods, since their root can split if heavy rain follows a dry spell.

Planting Notes: Where winters are mild, plant parsnips in late summer and continue with periodic plantings through spring. In cold climates, plant parsnips in spring for winter harvest. Cover seed with .5" of soil and thin plants to 3" apart.

Seed Saving: Parsnips are biennials. Protect plants and harvest seed as for carrots, above.	
Parsnip Pastinaca sativa	Recommended varieties: All-American, Harris Early Model, Hollow Crown, Tender and True

X. The Asparagaceae Family

<h1>Asparagus</h1> <h2>Genus: Asparagus</h2>
<p>Planning Notes: Asparagus is a perennial vegetable that can live for 10-15 years in the garden in well-drained soil, sending its delicious shoots up each spring. Where soil is heavy clay, add sand and compost and consider growing asparagus in raised beds to help with drainage. An asparagus bed will also need additional phosphorus, potassium, and possibly lime, depending on soil pH. Asparagus can be grown from seed, but many gardeners start plants with purchased crowns so that they do not lose a year waiting for the plants to grow. Ideally, asparagus beds are prepared well in advance. Asparagus plants are heavy feeders and benefit from regular additions of compost and composted manure.</p> <p>Mature asparagus can be harvested over a 6-8 week period but does not store well fresh. (It can, however, be canned or dehydrated.) It is a seasonal treat that is high in potassium, folate, and vitamin K.</p>
<p>Planting Notes: Plant asparagus crowns in spring once soil temperatures have reached 50° F. Dig a furrow 5" deep and plant crowns 18" apart in rows 5' apart. Many sources recommend applying phosphorus in the furrows immediately before planting. Gently pull the soil over the crowns until the soil is level, but don't tamp the soil down.</p> <p>If you are planting asparagus seeds, you will probably not realize a harvest until the third season. Start seed indoors two months before last frost and then transplant seedlings into the garden when soil temperatures reach 50° F.</p>
<p>Seed Saving: If you are growing nonhybrid asparagus, let some spears grow into ferns. They will bear red berries. Harvest these and mash them gently in a bowl. Let this mash ferment until a white scum forms, then rinse the scum off with water.</p>

<p>Asparagus</p> <p>Asparagus officinalis</p>	<p>Recommended varieties: Because asparagus lives so long, a hybrid variety such as Jersey Knight or Jersey Giant can be a reasonable choice. Nonhybrid varieties include Mary Washington, the French heirloom variety Argenteuil, and UC 72, a Mary Washington type that better tolerates heat and drought.</p>
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XI. The Malvaceae Family

<p>Okra</p> <p>Genus: Abelmoschus</p>	
<p>Planning Notes: Varieties of okra will cross, with the help of insects, unless separated by 1 mile. Choose one variety. If neighboring gardeners are growing different varieties of okra, cage entire plants or bag blossoms in 4" x 6" drawstring bags made of muslin or spun polyester, or use lengths of women's nylon hose, closed at the top and secured at the bottom.</p>	
<p>Planting Notes: When the soil is warm in late spring, plant okra seeds 1/2" deep in an area where the crop will receive full sun. Thin plants to 6" inches apart. Okra plants produce most prolifically if the pods are picked often.</p>	
<p>Seed Saving: Cage entire plants or bag blossoms in 4" x 6" drawstring bags made of muslin or spun polyester, or use lengths of women's nylon hose, closed at the top and secured loosely at the bottom, so that insects can wiggle in to pollinate them. Allow the bagged pods to dry out and turn brown before harvesting the seed, but be sure to harvest before the pods split open far enough to drop their seeds.</p>	
<p>Okra</p> <p>Abelmoschus esculentus</p>	<p>Recommended varieties: Clemson Spineless, Silver Queen, Aunt Hettie's Red</p>

XII. The Gramineae Family

Corn

Genus: *Zea*

Planning Notes: Corn varieties, which are wind pollinated, cross readily. Seed can be saved from different varieties of corn if the planting of each variety is staggered so that the two varieties tassel at different times (check days to maturity) or if hand pollination techniques are used. Otherwise, varieties must be separated by 2 miles.

If you will be saving seed, you need to plant at least 200 plants of a single variety and save seed from at least 100 of these. Without the genetic diversity afforded by many plants, seed quality is likely to decline, and future corn crops may prove weaker, smaller, and slower to produce. Keep an eye on the crop and remove rogue plants that differ from the rest.

For best pollination, it is better to grow corn in blocks rather than in a single long row. Plant a block no smaller than 10' x 10' to ensure productivity.

Planting Notes: Plant corn where it will receive full sun, when the ground is warm (at least 65° F). Cover the seeds 1-2" deep. Thin stalks to 6-8." Corn is a heavy feeder.

Seed Saving: If two varieties are not isolated by sufficient distance or by means of staggered planting times, hand pollinate in order to save pure seed.

Supplies required:

- A small sharp knife
- A hand-held stapler and staples
- #217 shoot bags and #402 tassel bags (made of material that will not decompose in the field) available from Lawson Bag Company (847-446-8812) in lots of 1000.

Corn

Zea mays

Recommended varieties:

Sweet corn for fresh eating, freezing or canning: Golden Bantam Improved (yellow), Country Gentleman (shoepeg white), Stowell's Evergreen (white), Trucker's Favorite (harvest young for fresh eating,

Corn for storing and grinding into cornmeal: Reid Yellow Dent, Bloody Butcher (red), Hickory King, Hopi Blue (wildely adaptable)

Popcorn: Tom Thumb, Red Strawberry

XIII. The Gramineae Family

<h3>Hulless Oats</h3> <p>Genus: <i>Avena</i></p>	
<p>Planning Notes: Hulless oats are the easiest grain to process at home, and that is why they are included here. Plants grow to 3 feet tall. In cold climates, hulless oats die during the winter, and spring crops can be planted right into the matted mulch they create. Hulless oats require sun but are not particular about soil and can tolerate drought.</p> <p>Oats are an excellent source of fiber, and they offer the highest protein of the cereal grains, along with phosphorus, potassium, and iron. They help reduce risk of heart disease and colon cancer, and are packed with nutrients. Moreover, they have a modest effect on blood sugar and thus are better for diabetics than rice or pasta would be. They are not a good choice for gluten-sensitive people or those who suffer from celiac disease.</p>	
<p>Planting Notes: Seed in spring at a rate of 2.5 lbs. per 1000 sq. ft.</p>	
<p>Seed Saving: Cut the stalks when they are dry. Treat seed grains gently because they have no hull to protect them, and thresh grain to be used for eating.</p>	
<p>hulless oats</p> <p><i>Avena nuda</i></p>	<p>Recommended varieties:</p> <p>Terra (best for home growing), Baton, Freedom, Tibor</p>

XIV. The Amaranthaceae Family

<h3>Amaranth</h3> <p>Genus: <i>Amaranthus</i></p>	
<p>Planning Notes: Amaranth is grown as grain, but its young leaves are consumed as greens. Tiny amaranth seeds are high in calcium, iron, and lysine, a rare but vital amino acid. Mix amaranth with another grain, and you have a complete protein. Amaranth varieties cross, so choose one. Amaranth reseeds itself.</p>	
<p>Planting Notes: When daytime temperatures reach 70°F, direct seed amaranth in a prepared bed and cover seeds lightly, if at all. Thin plants to 18" apart.</p>	

Seed Saving: When amaranth seeds are mature, they can be shaken or rubbed free from the plumes whether they grow. To harvest them, cut off a plume (the seed head) when most of the seeds are ripe, then dry the plume, out of direct sun, on a clean cloth or plastic. Wear gloves to rub the seed heads and release the seeds. You can also beat two plumes together over a tarp and use the tarp to corral the seeds. Make sure the seeds are completely dry before storing them. Getting rid of the flowery bits from the plumes is challenging because the seeds are also small and light, so winnowing must be done with care.

Amaranth

Amaranthus
hypochondriacus

Recommended varieties: Burgundy, Golden Giant, Mercado
(native to Southern Mexico)

Appendix 1

Sources for Vegetable Seed

Abundant Life Seeds

(541) 767-9606
www.abundantlifeseeds.com
 (Oregon)

Amishland Heirloom Seed Conservancy

www.amishlandseeds.com
 (Pennsylvania)

Baker Creek Heirloom Seeds

(417) 924-8917
www.rareseeds.com
 (Missouri)

Bountiful Gardens

(707) 459-6410
www.bountifulgardens.org
 (California)

The Cook's Garden

(800) 457-9703
<http://www.cooksgarden.com/>
 (Pennsylvania)

Fedco Seeds and Trees

(207) 873-7333
www.fedcoseeds.com
 (Maine)

Garden State Heirloom Seed Society

www.historyyoucaneat.org
 (New Jersey)

Good Seed Company

<http://goodseedco.net>
 (Washington)

The Gourmet Gardener

(386) 362-9089
www.gourmetgardener.com
 (Florida)

Harris Seeds

(800) 514-4441
<http://gardeners.harriseseeds.com>
 (New York)

Heirloom Seeds

(412) 384-0852
www.heirloomseeds.com
 (Pennsylvania)

Johnny's Selected Seeds

(877) 564-6697
www.johnnyseeds.com
 (Minnesota)

Native Seeds/SEARCH

(866) 622-5561
www.nativeseeds.org
 (Arizona)

New Hope Seed Company

www.newhopeseed.com
 (Tennessee)

Peaceful Valley Farm Supply

(888) 784-1722
www.groworganic.com
 (California)

Renee's Garden

(888) 880-7228
www.reneesgarden.com
 (California)

Seed Savers Exchange (SSE)

(563) 382-5990
www.seedsavers.org
 (Iowa)

Seeds of Change

(888) 762-7333

www.seedsofchange.com

(New Mexico)

Southern Exposure Seed Exchange

(540) 894-9480

www.southernexposure.com

(Virginia)

Sustainable Mountain Agriculture Center

(859) 986-3204

www.heirlooms.org

(Kentucky)

Victory Heirloom Seeds

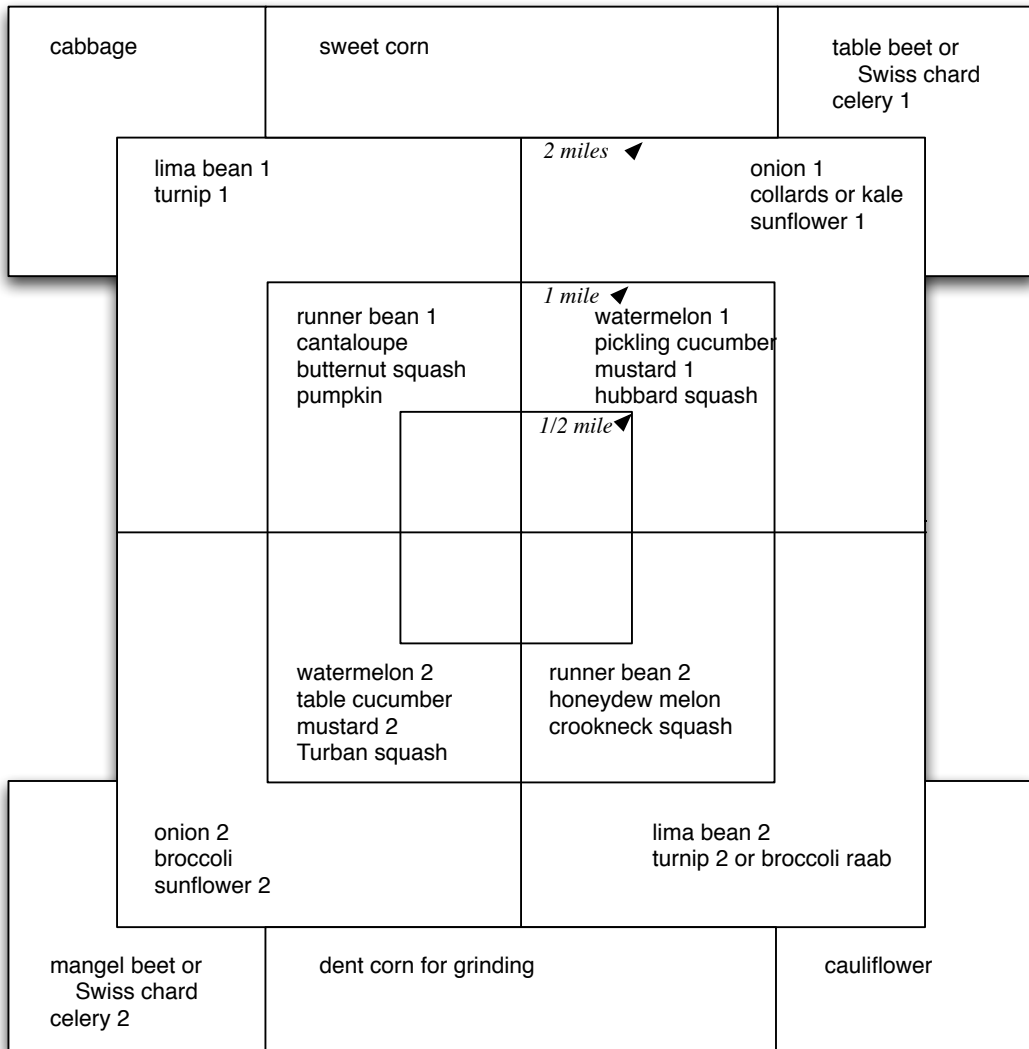
(503) 829-3126 (voicemail and fax order line0

<http://www.victoryseeds.com/>

(Oregon)

Appendix 2

Community Crop Planning: A Schematic Model



The diagram above shows how community-wide planning might help gardeners isolate varieties that cross in order to make seed saving easier. In reality the crop map can be as variable as any community layout, but will observe appropriate isolation distances for key crops. Alternatively, and wherever such systematic planning is not practical, seed can be saved using methods appropriate for a specific crop.

Appendix 3

Printable Seed Labels

Common Name	Common Name
Botanical Name: _____ _____ Family: _____ Description: _____ _____ Performance Notes: _____ _____ Taste and Usage Notes: _____ _____ _____ Resistance(s): _____	Botanical Name: _____ _____ Family: _____ Description: _____ _____ Performance Notes: _____ _____ Taste and Usage Notes: _____ _____ _____ Resistance(s): _____
Date Collected: _____ Expected Viability: _____ Collected by _____ Location: _____	Date Collected: _____ Expected Viability: _____ Collected by _____ Location: _____

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