

# SAVING VEGETABLE SEEDS IN AN URBAN GARDEN

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## INTRODUCTION.

In my all time favorite book, *Illusions*, Richard Bach write

There is no such thing as a problem  
without a gift for you in its hands.

You seek problems, because you need their gifts.

While still in diapers my daughter, Ava, was prescribed Amoxicillin for an ear infection. Within hours of digesting it, all the skin from her waist to her knees peeled off. That was the day we discovered she has an allergy to the ‘cillan’ family of antibiotics.

Through elementary school she suffered the wrath of a frustrated mother calling her a ‘picky eater’ because I could find no affordable food that she would eat. She now tells me she chose to go hungry most of the time because every time she ate food she felt sick. That is when I started looking for available land in my urban neighbourhood to grow our own vegetables, and Neighbourgardens began. Neighbourgardens is a not-for-profit organization which establishes connections between people who have garden space they do not have the ability, time, or know-how to tend, and people wishing to have the use of a garden patch in their neighbourhood to grow fresh vegetables to feed their families. Since then all the vegetables my daughter eats have been grown in our garden from seeds I know to be open-pollinated, and she loves them. But hers is not an isolated incident by any means. In my work as Neighbourgardens coordinator for almost 3000 gardeners and landowners I have noted a marked increase in the number of parents of children with food allergies, eating disorders, obesity or simply wont eat, looking for gardening land to grow their own vegetables.

Motivated by this increasing trend, I dug deeper. Further research revealed that ‘cillan’ antibiotics are used to connect the ‘Terminator’ and all the various ‘Traitor’ technologies in Genetically Engineered/Modified (GE/GM) seeds. The ‘Terminator’ is a genetically engineered chemical which is inserted into seeds to render the next generation’s seeds – and the seeds of any other plant that it cross-pollinates with – sterile, so that farmers and gardeners have to buy new seed each season from the multinational chemical companies.

Since the 1990s hundreds of different ‘Traitor’ patents have been issued. For example, in 50 different patent applications filed by Novartis and AstraZeneca (patent WO9735983) they state that these genetically engineered chemicals will weaken the plant’s natural resistance to pests, viruses, bacteria and diseases to the point where it will die without continued exposure to herbicides and other chemicals, that these companies also manufacture. In other words, GE/GM seeds are addicted to chemicals.

Intekom.com report that rats fed on GE potatoes display suppressed immune systems. A Cornell University study states that caterpillars and butterflies (including our beautiful monarchs) fed on pollen of GE/GM corn ate less, grew slower, and died faster than caterpillars not fed on GE/GM pollen. Fish in Lake Mead Nevada and frogs in 70% of US and Canadian wetlands show deformities such as missing or extra legs and fins and misplaced eyes (Bellingham Echo #273) Moreover, Greenpeace.com also advise that:

The resistance gene present in the GE/GM seeds is now known to generate human resistance against all the following antibiotics: Benzyl penicillin, Ampicillin, Amoxicillin, Phenethicillin, Carbenicillin. Methicillin, Flucloxacillin, Cloxacillin and Tetracycline.

While no studies on the long term affects of human ingestion of GE/GM food have been conducted, tests show that GE/GM vegetables contain less than 60% of the nutritional value that the vegetable would contain naturally. This means that human beings need to eat 50% more food in order to gain the normal daily nutrition their bodies are accustomed to. This GE/GM food is the root cause of the spiraling obesity problem today.

After DuPont (the second largest American Genetic Engineering Company next to Monsanto) purchased Pioneer Hi-Bred International Seed Company for \$7.7billion in the 1990s almost 100% of the open-pollinated seed industry was firmly in the hands of five Multinational GE/GM companies, according to Rafi.org. Since then, these companies have pressured governments to have open-pollinated seeds, that have been around for thousands of years, listed as unacceptable plant varieties, while GE/GM seeds are presented as the 'green' solution to feeding the world's population. Moreover, since they are not required to label seeds, seedlings, plants or foodstuffs with any GE or GM designations, knowing your seed supplier and/or the environment from which your vegetable seeds are derived takes on a whole new importance.

Moreover, in the global precedent setting case, Monsanto vs, Percy Schmisser (Canada, April 2001), Judge W. Andrew MacKay decreed that if any GE corn pollen, from neighbouring land, cross-pollinates with your open pollinated corn, Monsanto can sue you for theft of patent royalties of their intellectual property. While this defies logic for most of us, it is a good example of both the mentality of the multinational GE corporations that are trying to control the global food supply, and just how much power they have over governments and judiciaries world wide. All published seed saving information states, without exception, that different varieties of vegetables need to be isolated, to avoid problematic cross-pollination, by distances ranging from one quarter to twenty odd miles. This, of course, is just not possible with forty different neighbours all growing their family's vegetables along the same back lane as my garden. It is not possible in any urban environment. Other rural solutions were not practical either. Professional vegetable growers construct large wooden or steel cages to house seed bearing plants together with trapped insects inside the cage to pollinate the flowers. Given that the seed stalks of beets, swiss chard, cabbage and many other common vegetables are multi-branched and five feet tall, the dimensions of the cage, and the expense of building them seemed outlandish.

Finally, I turned to the large number of elderly gardeners registered with Neighbourgardens. Pooling the vast amount of experienced knowledge they offered, I began experimenting with bagging methods, hand pollinating techniques, seed saving and regrowing. The following article is the result thus far, but there is always room for more and better information. As such, I would greatly appreciate further input from urban gardeners to keep building and updating this data base for the benefit of all urban gardeners, and especially the hundreds of thousands of adults and children afflicted with chemical food allergies now and in the future.

The 'gift' I found in the hands of my daughter's problematic allergies, indeed, the global GE/GM problem, is a deeper insight, understanding and appreciation of that which has always been all around us: You take a single lettuce seed, small as a sliver, plant it in the soil, it rains, the sun shines, you watch. A plant grows, quickly too, and it will feed you good, healthy, nutritious food all summer, leaf by leaf as you need it. Then at summers end it will send up a two foot tall seed stalk that will produce up to 60,000 more lettuce seeds that will grow 60,000 more lettuce plants. Every vegetable plant works via the same principle, reproducing far more than the number needed to perpetuate its species each year, in order that we might also be sustained. It's a superbly designed food system that has worked flawlessly for every living being on the planet for as long as we have all been here. A system that by design, guarantees such abundance that no living being on the face of this planet should ever be hungry. What an incredible gift! Given freely and equally to every living being. This beautiful, practical, sustaining system is all around us, every moment of our lives, in our faces, and yet, for the most part we miss its point. That everything we need has already been given to us, free of charge even. The sun, the rain, the soil, the seeds. The global food supply. It's a system worth focusing on, to be reminded of what is real and good in the world. A system worth choosing to be part of, to interact with, support and protect with our energy, to experience and know its magic. A system worthy of our deepest gratitude.

As cognizant human beings, we have been given so many additional gifts above and beyond the

food system that sustains us. We have the ability to go beyond the propaganda and recognize right from wrong, true value from greed and destruction. We have the ability to choose, to align our energy with whichever path into tomorrow we choose, and to reap, or suffer, its consequences. And the ability to experience the power and joy of a heart filled with gratitude. For gratitude is the antithesis of greed.

Rae Blewden.

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## **GENERAL SEED SAVING INFO**

### **F1 HYBRID SEEDS PRODUCE STERILE SEEDS**

Many seeds and seedlings offered by plant merchants today are hybrids. These are not GE/GM seeds. They are two or more varieties interbred to produce a seed that will grow into a plant with specific qualities such as seedless watermelons, **FOR ONE GENERATION ONLY**. Most of these hybrid seeds, seedlings and plants sold are designated as F1 on the packaging. F1 stands for the first-generation offspring of two inbred parent plants. However, seed harvested from F1 plants produce plants unlike either of the parent plants and in most cases are sterile. So, the first point to remember here is: Do not buy hybrid F1 seeds or plants this year if you want to save the seeds for next years vegetable crop.

### **STORE BOUGHT VEGETABLES.**

The second point to be aware of is that store bought produce is more often than not, grown from F1 seeds. Thus saving seeds from that good looking store-bought squash is not such a good idea.

### **SAVE ONLY OPEN-POLLINATED SEEDS**

Original plants grown from open-pollinated seeds produce the best seeds to save. If seeds are always saved from the healthiest, best producing plants, as the cycles of planting, seed saving, and replanting continues year after year, open pollinated seeds will naturally adjust themselves to the growing conditions of their garden to become stronger, more resistant to local pests and diseases. Such treasures are often called 'Heirloom' seeds, which are often handed down from one generation to the next. So, point three is: Only save seeds from healthy, good producing plants grown from 'Open Pollinated' or 'Heirloom' seeds.

### **HEALTHY PARENT PLANTS PRODUCE HEALTHY SEEDS**

Unhealthy plants can often pass diseases to the next generation of plants through their pollen or seeds. Give seed bearing plants plenty of water, light and fertilizer early in their lives, so that they are strong and healthy. Only strong healthy parent plants can produce robust seeds worth saving.

### **CROSS-POLLINATION PROBLEMS**

In order for a plant to produce seed it must be fertilized with pollen. Some vegetable plants are self-pollinated which means they have both male and female parts and are receptive to their own pollen. This allows them to fertilize themselves. However, among self-pollinating plants, some are exclusively self-pollinated, whereas others can be fertilized either by themselves or by other plants of the same species. Yet other plants actually require pollination by another plant in order to be fertilized. Pollen is transferred between plants either by wind, the movements of insects (primarily bees), or by human hands. By any of these methods pollen can be carried over one hundreds of miles, or from the next flower on the same vine. Most vegetable plants are also receptive to pollen from different members of their species. For example, cabbage, broccoli,

brussel sprouts, turnips and radishes are all members of the same species and can all cross-pollinate with each other. Furthermore, open-pollinated plants can also cross-pollinate with F1 hybrid plants and/or GE/GM plants which will produce seeds that are sterile. The variables are many, and in an urban environment it is not possible to know what kind of pollen is reaching your plants from all the other neighborhood gardens. Thus, to save true-to-type seeds it is necessary to control the fertilization of your plants, by covering the blossoms with bags to keep untrustworthy insect and wind blown pollen out.

## **BAGGING METHODS**

### **UNWISE.**

Avoid using paper bags to isolate seed bearing plants as they block the light from developing seed and disintegrate in the rain. Also, never use plastic bags which cause flowers to die of heat and lack of ventilation.

### **SMALL AND MEDIUM PLANTS**

The best bagging material is old stockings. Simply cut the foot off, slip it over the flower head and twist-tie it securely around the stem. Alternatively, spun polyester cloth, often called Landscape Cloth, Remay, Row Cover or Weedbuster Matting can be cut into pieces. Wrap it loosely to allow space and not damage the flowers, and twist-tie securely around the stems of individual flowers or flower clusters to prevent insects or wind born pollen entering. This material can also be sewn, heat sealed or folded and stapled in to actual bags. If several seed stalks are being bagged together, pack between the stalks with cotton batten to prevent insects entering. Both these materials will prevent cabbage worm, butterfly, carrot rust fly, flea beetles, aphids, thrips, leaf miner flies and bees from reaching bagged plants with unwanted pollen.

### **LARGE PLANTS**

Many vegetable plants that produce 5' (150cm) tall seed stalks can be isolated by constructing a large bag from two light coloured bed sheets (with no holes). All the seams must be sealed well as bees, in particular, will enter through even the smallest crack. At the same time the bag must allow the gardener multiple entry to hand pollinate all the flower heads inside every few days for several weeks.

### *PROPAGATION BAGS*



The author as designed and produced special seeds saving bags of material that allows light and rain in, but keep all insects and wind blown pollen out. They can be used to isolate all medium and large sized vegetable and flower plants up to 6' (185cm) tall, and up to a square yard (one meter) in ground area. Two long zips in alternate corners at arms height allow gardeners to see and reach seed heads throughout the interior.

Simply insert four 6' (185cm) stakes into the group of plants to be isolated, tie the seed stalks to the stakes for support. Slip the bag over the top of the group with a stake pointed into each top corner of the bag. Secure the bottom of the bag to the ground with rocks, bricks or soil. For shorter plants simply use shorter stakes. These bags can be mailed world wide for \$US25 plus \$5 shipping and handling. Email: [neighbourgarden@hotmail.com](mailto:neighbourgarden@hotmail.com)

Once plants are isolated, by following the hand pollination instructions according to each vegetable listed, you can be sure your saved seeds will produce uncontaminated true-to-type plants in the years to come.

## **WATERING DURING SEED FORMATION**

Seed producing plants need plenty of water, fertilizer, and light from their early development through to seed formation to produce strong seeds. If flowers receive too little water they produce fewer and less vigorous seeds. However, once seeds have reached full maturity water should be withheld from plants to allow the stalk and seeds to begin their drying process.

### **HARVESTING SEEDS BEFORE IT RAINS.**

If drying seeds become wet again from rain or frost, several problems occur. A second drying process depletes precious food reserves within the seeds that are needed to sustain them through storage and germination into strong healthy fruit producing plants next year. Moreover, repeated shrinking and swelling of their seed coats damages the seeds, often to the point where they will perish from mold and mildew inside the pod husks. Once seeds are fully developed and have begun their drying process, and rain threatens, either cut the seed stalk off, or pull up the entire plant, and bring it indoors to complete the drying process away from direct sunlight and mice.

### **WINTER STORAGE**

To survive winter storage seeds must be completely dry, otherwise they will perish from mould and mildew. If seeds sweat inside closed jars, they need further drying before being stored. The best rule of thumb to test dryness is: if seeds break instead of bend when folded, they are ready. Don't forget to write the plant's name on the container before storing.

Large seeds like beans and melons, are prone to weevil infestations inside the seeds. These are best controlled by storing seeds in air-tight containers in the freezer all winter. So long as the seeds are completely dry they will not be harmed. I put all mine in separate labeled ziplock bags in one airtight jar in the fridge all winter.

### **STORAGE TEMPERATURE FLUCTUATIONS**

Temperature fluctuations during winter storage damages seeds and roots. Once they have been put into storage it is best to move them as seldom as possible. In the spring, allow containers to reach room temperature slowly before opening them, to prevent condensation wetting the seeds. While most seeds can be stored for years, long term storage does lower their vigour. The overall health of seeds, and the plants they produce, is improved if they are planted, regrown, and a fresh batch of seeds saved every few years.

### **SEED VIABILITY TEST.**

Before planting seeds in the spring it is a good idea to test their viability. Wet a paper towel and squeeze out the excess, place about 10 seeds on the surface so they are not touching. Roll up the paper towel carefully, insert it into a plastic bag with sufficient holes punched in it for them to breath but not dry out, and then put it in a warm place. On the top of the refrigerator at the back is a good place, or in the hot water tank closet. After a week, carefully unroll to look for evidence of germination. After seeds begin sprouting, give them another week rolled up in the damp paper towel. Make sure it stays moist. Then count how many seeds have germinated. Many gardeners consider anything less than 50% (half of the seeds tested) to be a waste of time, however when planted 2 seeds per hole they can still render a reasonable crop of seedlings. If you're very careful not to break the sprouts, you can plant these germinated seeds if the timing is right. Simply tear the paper towel around the germinated seed and plant it, paper and all. Allow the rest of the freezer stored seeds to stand open to the air for a few days before planting to gain some moisture. This will also avoid the shock of going directly from freezer to soil.

Enjoy.

**AMARANTH.** Also called Tampala.

Amaranth is self-pollinating, but will cross pollinate via wind and insects with other varieties, including the weed called 'pigweed'. Many of these cross-pollinations produce only sterile seed. To generate strong plant seeds tie 4 or 5 healthy plants together with stakes. Cover with a bed sheet sealed to prevent insects entering, or a *Propagation Bag*. Shake the bag each day to help distribute the pollen throughout the flowers inside. Remove the bagging after all the flowers have finished blooming and seeds are visible. A light harvesting of the leaves will not harm seed production. The seeds mature gradually from the bottom up, so need to be harvested daily by shaking them into a bag. If rain threatens, cut all the seed stalks and hang them upside-down in a bag indoors to finish drying away from direct sun-light. Amaranth flowers can be very sharp so use gloves when rubbing the flower heads together to release the seeds into a bowl. Pick out the debris, but be careful not to lose the very small light seeds. Seeds will remain viable for about 4 years stored in a ziplock bag in the fridge.

**ARTICHOKE** Often called Globe artichoke. (See separate listing for Jerusalem Artichoke)

Artichokes do not usually reproduce true-to-type from seeds. In fact, in mild climates, plants that have been let to seed have propagated large populations of weeds. Moreover, much more plant energy is put into the next crop of flower buds (the part that is eaten) when the plants are prevented from going to seed. So be sure to break off any flower buds as soon as they appear and destroy them immediately.

The best way to propagate artichokes is by dividing the root of plants that produce the best fruits. In areas where the ground freezes, this process of dividing is best done when plants are dug, trimmed back and stored for the winter. In milder regions the plants can be trimmed back to 6" (15cm) tall and wintered in the ground under a mound of straw or leaves to protect the roots. During the spring the plant will produce over a dozen side shoots. Cut half of the smallest ones off so that the largest ones can expand. When these reach 1' (30cm) with good leaves and lots of small roots cut them from the base of the plant with as many small roots as possible still intact, and replant in a permanent place. After the first harvest, pull out any non-productive plants to leave room for the productive plants to grow bigger the next year. Plants will usually grow to 3-5ft (100-150cm) wide and tall, and produce for several years.

**ARUGULA. Also called Rocket.**

Arugula is self-incompatible, which means you need several plants to get fertile seeds. Different varieties will cross-pollinate with each other, but will not cross-pollinate with other members of the cabbage family. So, while some small variations in characteristics may occur, the seeds will still produce a good crop of arugula.

Simply allow seeds to ripen and dry on the plant. But do not leave for long after they are dry as the pods are thin-walled, and shatter quickly after drying dispersing the seeds to the ground.

Collect the seeds off the plant regularly by shaking seed heads into a bag. If rain threatens, cut the seed stalks and hang upside down in a bag indoors to dry. Rub the dry flowers between hands to release the seeds and blow the chaff away with a hair dryer. Stored in a fridge seeds will remain viable for 4 years.

**ASPARAGUS**

Asparagus is best not grown from seeds as there is a 3 - 5 year wait for edible stalks to emerge. Usually Asparagus is propagated by dividing the roots of plants during the winter after their third year of growth. Simply lift the tangle of roots from the ground and carefully tease the separate crowns out. Trim the roots back to about 6" (15cm) and replant about 15" (40cm) deep in a mound of rich compost. These new crowns can be harvested from their second year on. Once you have plants growing they will continue to self seed themselves quite readily.

Alternatively you can also save your own seeds and start fresh. Wild asparagus is virtually the same as cultivated plants, so you can harvest the berries from road-side plants with no ill effects. There are so few varieties that cross-pollination is not a problem. To generate your own seeds

you will need both a male and a female plant growing in close proximity to each other. The males have a number of thin, spindly stalks early in the growing season which later produce yellowish green bell flowers. Female plants have just a few thick, tender stalks that later produce seeds inside little red berries. Insects, usually bees, will pollinate during the summer months. In the fall, when the berries turn red and the fern-type top leaves flop over, cut the top off the plant and hang it upside down to dry. Now, you can either soak the berries for an hour or so until you can remove the seeds from the fruit, or, put the berries in a bag and crush them with a rolling pin. Then put the pulp and seeds in a bowl of water until all the good seeds have sunk to the bottom. Pour off all the pulp and any seeds that did not sink (non-viable seeds float, good seeds sink). Spread the wet seeds out on a tray (not newspaper, the seeds stick to it) in a warm, dry, airy place for about a week or so until they are thoroughly dry. If stored in a sealed container in a cool, dry, dark place the seeds should stay viable for about three years. Before planting in the spring, soak the seeds for a day or two in luke warm water to soften the tough seed coats. Put the bowl on the top of the fridge at the back, or on top of the hot water cylinder to keep the temperature up.

### **BASIL**

There are several varieties of basil, which can all be propagated by cuttings. Asian shops often sell unusual basil like lemongrass, anis and cinnamon flavored basil that can be used as original plants. Simply put the stalk bottoms in a container of water (I put mine on the windowsill) until the roots begin to grow, then replant.

### **BEAN FAMILY**

Saving seeds from members of the bean family is done in different ways, therefore, many are listed separately in alphabetical order. The following pertains to all common beans not listed separately.

All peas and beans are self-pollinating, but cross-pollination is a hotly debated issue, which means it does sometimes happen. So bagging is advised if you want to be sure that saved seeds reproduce true-to-type plants. Be sure to only collect seeds from a healthy plant. Be careful during tilling as bruised bean plants are very susceptible to anthracnose which can pass on to the next generation of plants through the seeds. Also, be sure to harvest seeds before the first frost or seeds will be injured.

#### **BAGGING:**

Use old nylon stockings, spun polyester, white row-cover cloth, Reemay, or similar light coloured material that will not block too much light or the flowers will not develop properly. Fashion a seamless bag over a healthy flower head, before the flowers open, and twist tie it closed around the stem to prevent insects from entering. Remove the bag when the small seed pods begin to show, and tag the stem with coloured tape so that the pods will not be harvested for food by mistake.

#### **HARVESTING:**

Bean pods are usually left on the plant until they rattle, usually about 6 weeks after you have harvested the other beans for food. But do not let them get wet as moisture from rain during seed maturation lowers the viability and storage life of the seeds, and can cause them to sprout or mildew while still on the vine. So if frost or rains threaten, pull up the whole plant, roots and all, and hang it upside-down to finish drying over a tarp or sheet in a dry airy place. If pods do not split and release the seeds by themselves, place the pods in a pillow slip and jog up and down on it or role with a rolling pin. Pour seeds into a bowl and use a hair dryer to blow the chaff away, leaving the seeds clean for storage. When hit with a hammer seeds that mash need further drying



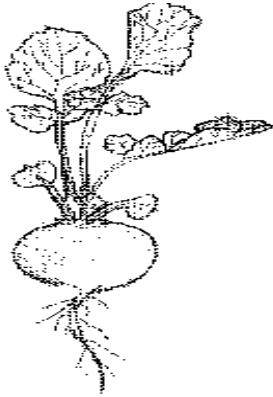
time, seeds that shatter are dry enough to store. Alternatively bite down on a seed, if you can not put a dent in it, it is ready for storage.

#### STORING:

Legume seeds can be prone to attack by bean weevils, which lay eggs in the flowers or young seed pods that hatch into larvae inside the seeds and slowly eat their way out leaving tiny round holes. The weevils usually emerge in the spring, mate and lay eggs in a new crop of blossoms. One way to kill any eggs is to freeze the dry seeds in an airtight container for at least five days. This won't hurt the seeds as long as they're absolutely dry. Let the container of seeds sit unopened over night after it has been removed from the freezer so that condensation does not occur and moisten the seeds. Store in a cool, dry, dark place in paper, cloth, or open topped jar, to allow air to enter (but not water or mice), rather than in a sealed container. Legume seeds maintain viability for 10 years if you can keep them away from mice.

## BEETS

Beets are a biennial crop, which means that they produce an edible crop the first year but do not produce seed until the following year. Occasionally beets do bolt to seed the first year but the seeds are not viable. Most store bought beet seeds are F1 hybrids which produce only sterile seeds, so make sure you



start with an open pollinated variety if you wish to save the seeds. Be sure to mix good compost organic fertilizer into the soil under the seed when you plant to get good root development, and seed directly into the ground as beets do not like to be transplanted. Sow them in summer so that bulbs do not get too big the first year. In most areas the mature roots can be left in the ground covered by a heavy mulch of hay or leaves over the winter.

In regions where the ground freezes dig the mature roots up before the first frost. Be careful not to nick or bruise the roots or they may rot during storage. Cut the green tops down to about 2" (6cm) and pack the roots in damp sand or sawdust with shredded newspaper covering the green tops. Store at 32°-40°F. at 90-95% humidity.

In the spring replant the best (not withered) roots 2' (60cm) apart with their crowns barely beneath the soil. In their second season they will send up 4' (120cm) seed stalks. However, for seed production both male and female plants need to be growing in close proximity, and there is no way of knowing which is which until the seed stalks begin to form. Female plants form seeds at the juncture to the stems and leaves. Males form stems of flowers protruding out from the juncture of stems and leaves. As soon as you can tell one from the other, choose the healthiest four females and two male plants growing close together and pull out all the rest. Beets will cross-pollinate with swiss chard and spinach, so bagging is necessary.

#### BAGGING.

Beets, Swiss chard, and Spinach are all bagged the same way. As the 4'-5' (120-150cm) seed stalks form, place four 6' (185cm) stakes in the center of the six plants. Bend and tie the seed stalks to the stakes.

These plants have extremely fine grained wind-blown pollen which will pass through spun polyester material. Wrap a large bed sheet (with no holes) around the group of plants. Be sure to fold and seal any openings with duct tape and/or staples, and seal the bottom with rocks or soil to prevent insects entering and pollen from escaping. Or slip on a *Propagation Bag* (see Bagging Methods above) with the stakes forming the top corners. Shake the bag each day to distribute the pollen from one plant to another.

#### HARVESTING SEEDS.

The seeds can be progressively stripped from the plant as they mature. If rains threaten the seed stalks can be cut when the majority of the seeds are mature, and hung upside down in a bag indoors away from direct sunlight. Harvest seeds when the majority of the clusters have turned

light brown. Some beet and prickly-seeded spinachs can be hard on the hands so gloves are necessary. Jogging up and down on a bag of dried stalks will help free the seeds. Pour seeds into a bowl and blow the chaff away with a hair dryer.

Beet seeds have a unique structure in that they form a woody cluster which usually contains two to five seeds. These clusters can be planted next season as is, then continually harvest the largest beet as it rises above the soil leaving the rest of the cluster of smaller ones in the ground to expand in size. Alternatively, seed clusters can be placed in a bag and gently rolled with a rolling pin. Adjust the pressure until clusters are broken apart but not crushed.

Seeds retain 50% germination for six years if stored in a cool, dry, dark place. Beet seeds have a germination inhibitor in their coats, so soak seeds overnight to soften them before planting in the spring.

### **BITTER GOURD**

Bitter Gourd do not cross pollinate with anything else, so their seeds can be saved from homegrown or store-bought fruit. After picking, leave the fruit in a paper bag to mature. When they split open scoop the red seeds out into a bowl and soak for a few days in water. Pour off the red pulp and turn the hard beige seeds on the bottom of the bowl out onto a shiny tray to dry. Stored in a cool, dark, dry place seeds will be viable for about 5 years.

### **BORAGE**

Borage does not cross pollinate with anything else. Once you have one plant it will reseed itself, but be careful to keep it contained or it can take over its surrounding area like a weed. Each seed capsule contains 2 round seeds which can be hand picked. When dried and stored in a cool, dark, dry place seeds will remain viable for 5 years.

### **BROCCOLI.**

In warmer regions early varieties can be started in a greenhouse and planted out in the early spring for seed harvesting in the fall. In regions where the ground freezes, or with longer growing season varieties of broccoli, dig the plants up in the fall and replant them into pots of soil to be stored in a cool place indoors for the winter. They will rot before spring if stored in a root cellar. The best seed comes from pollinating flowers on the central head. The side sprouts can be harvested for the table. Different varieties of broccoli will cross-pollinate with each other, and with other members of the cabbage family, so bagging is necessary in order for saved seeds to reproduce true-to-type. Follow instructions for the Cabbage Family. Broccoli seeds remain viable for five years when stored in a fridge.

### **BRUSSEL SPROUTS.**

In regions where the ground freezes, dig the plants up at the end of their first year and replant them into pots of soil to be stored in a cool place indoors. If stored in a root cellar they will rot before spring. Replant in the spring and harvest the top and bottom sprouts for the table. Then cut the top leaves off the plant to divert the plant's energy to the center branches of flowers which produce the strongest seeds. Follow bagging, hand-pollination and harvesting instructions for the Cabbage Family.

**BUTTER BEANS** See Lima beans.

### **CABBAGE FAMILY**

Including Kohlrabi, Radish, Turnip, Rutabaga, Kales, Collards, Cauliflower, Broccoli, Brussel Sprouts, and Cabbage,

All members of this family are biennials, requiring two seasons of growth to produce seeds. Most are also self-incompatible requiring pollination from other plants of the same variety to

produce true-to-type seeds. Moreover, all cabbage family members cross-pollinate with all of the other members so bagging and hand pollinating several plants of the same variety is necessary to save true-to-type seeds.

In regions where the temperature remains above 28F throughout the season cabbages can be planted in the fall for seed production the next summer. In cooler regions plant late season storage varieties such as Danish Ballhead, Rio Verde, Green Winter, or Market Prize during the summer. Dig the plants up in the fall when they are at their prime and replant into pots of soil to be stored in a cool place indoors for the winter. They will rot if stored in a root cellar.

In the spring trim off any loose leaves and cut a + a good inch or two (4cm) deep in the top of each head to allow the seed stalk to emerge, and then replant.

#### **BAGGING**

As they grow, pull out any plants that bolt to seed early, or are not in healthy condition. The healthy plants will send up 3' – 5' (100-150cm) branched seed stalks that will all need to be tied to 6' (185cm) stakes for support. Do this in such a manner as to allow each plant to be within reach and tag each plant with a different colour tape for easy identification. Construct a large bag of landscape cloth, row cover, or Remay, or slip a *Propagation Bag* (see Bagging Methods above) over the stakes and plants. Seal all openings as bees can enter even through the smallest crack. Seal around the bottom with bricks, rocks or soil to prevent insects entering. Pinch the top off each seed stalk so that the plant's energy is diverted to the lower branches which produce larger, stronger seeds.

#### **HAND POLLINATING**

As soon as there are several flowers open on each plant, take a soft artist's paint brush and begin hand pollinating inside the bag. Open up the four petals of a flower, run the paint brush gently over the stamen and pistils inside the flower to transmit the pollen onto the brush. Be careful not to break any of the delicate pistils. Then move on and do the same thing to a flower on a different plant. Continue to transfer pollen from a flower on one plant to a flower on a different plant, until all the opened flowers have been pollinated. Close the bag. Every few days repeat this process as the flowers do not all open at once, The pollinated flowers will give way to seed pods that turn from green to yellow and then brown. Leave the bag on to keep the birds away.

#### **HARVESTING**

Mature pods will shatter easily, discharging all their seeds. As soon as each pod turns brown and rattles with the seeds inside, it should be hand picked immediately. Hand harvesting of individual pods needs to be done every few days for a few weeks, as pods do not all mature at once. Usually the pods will mature from the bottom of the stalk to the top. However, if rain threatens the entire seed stalk can be cut when the pods are yellow, and hung upside down in a bag, or over a sheet, to dry indoors. Jogging on the bag of seed pods will help the last ones to release their seeds.

When the seeds are completely dry use a hair dryer to blow the chaff away and store in an air tight ziplock in the fridge. Seeds will remain viable to 3-5 years.

**CANTALOUPE.** See Melons.

#### **CARROTS**

Carrots are biennials, that need to be over-wintered to produce seed in their second year. Occasionally carrots do bolt to seed the first year but the seed is not viable. Insects can cross pollinate carrots with a common road-side weed called Queen Anne's Lace (a wild form of carrot), wild fennel, and all other varieties of carrots and celery. In order to save true-to-type seeds your carrot and celery plants need to be bagged and hand pollinated. However, because the anthers shed pollen before the stigma is receptive hand pollinating carrot and celery flowers (called umbels) is a lengthy process requiring almost daily applications for about 2-4 weeks. But, for the determined seed saver, here is what you need to know.

Start with open pollinated seeds, rather than F1 Hybrids which produce only sterile seeds.

Choose a dozen of the healthiest carrot plants from your seasons crop. In mild climates the carrots can be left in the ground over the winter under a heavy mulch of hay or leaves. In colder climates where the ground freezes, dig the carrots up before the first hard frost and cut the green tops back to about an inch (3cm). Store the carrots in damp sand or sawdust in a cool place. In the spring replant only the healthiest roots in a group, 1'-2' (30-60cm) apart, with the crowns just below the surface of the soil.

#### **BAGGING:**

The plants will produce branched stalks of large white flower heads (umbels) about 10cm across and at least waist high. You will need at least ten umbels to get good diversity in your saved seeds. Place 4 tall stakes into the group of plants and tie the branches to the stakes in such a way that the whole lot can be bagged in one big bag. Keep the plants loose enough that each umbel can be serviced individually. Fit a *Propagation Bag* (see Bagging Methods above) over the group while the umbels are still immature, inserting the stakes into the top corners to keep the weight of the bag from damaging the flowers. Seal around the bottom with bricks or soil to prevent insects from entering.

#### **HAND POLLINATING**

Because the individual flowers on each umbel open over a 15-40 day period, and the stigmas are only receptive for 5-7 days (depending on the variety) hand pollinating needs to be done every few days (preferably between 7-11am) over a 2-4 week period. Further, you will need to keep the hairy flying insects away while you do it. Either of two methods can be used: Using a small soft artist's paint brush, rub the open flowers of one umbel several times in a circular manner, then move on to do the same to all the rest of the umbels. Repeat this process with all the open flowers a second time. This will ensure that each flower receives pollen from as many other plant's flowers as possible. Close the bag and repeat this process every few days until flowers have stopped opening. Remove the bag only after all the seeds are visible.

Alternatively, you can VERY GENTLY rub the palm of you hand over each umbel in a circular motion. Be careful not to damage any of the tiny styles. Make sure you have streaks of yellow pollen on your palm, then move on to the next umbel. Accumulate, mix, and redistribute as much pollen as you can between the umbels of the different plants, so that each open flower can receive pollen from several other plants. Close the bag and repeat the process every few days until the flowers stop opening.

#### **HARVESTING:**

When the seeds have fully formed and turned brown, usually in the hottest part of summer, pull up the whole plant or cut the umbels off and hang upside down indoors to dry. Ideally this should be done when the seeds are fully mature, and the umbels are dry, but still attached to slightly green stalks. If left on the plant too long dry umbels can shatter dispersing all your seeds. The best seeds come from the topmost umbel, and secondary seeds from the second largest umbels. Be sure to protect seeds from rain and nighttime dew. If threatened by rain, pull the plant out before the lesser umbels are ripe rather than loose the best seeds. Rub umbels between your hands, or over a screen to extract the seeds. The seeds are very light so sift the seeds through a screen or remove the chaff by hand. Unlike store bought seeds, which have been mechanically cleaned, home saved seeds have hairy whiskers on their coats, which enables them to dig their way into the soil. It will not do any harm to leave, or remove, these hairs. One plant may render anywhere between 1000-12,000 seeds in a year. Stored in a cool, dry, dark place the seeds remain viable for about 3 years.

#### **CAULIFLOWER**

In warmer regions early varieties can be planted in the very early spring for seed harvesting in the fall. In cooler regions dig the plants up in the fall and replant them into pots of soil to be stored in a cool place indoors for the winter. Stored in a root cellar they tend to rot before spring. The best seeds come from pollinating flowers from the central head. Follow Bagging, Hand-

pollination and Harvesting instructions for the Cabbage Family.

### **CELERY**

Celery will cross pollinate with other varieties, wild celery and carrots. A light harvesting of the outermost stalks the first year will not harm seed production. In warmer regions celery planted in the early spring will produce viable seed in the fall. In cooler areas where the ground does not freeze it can be wintered under a heavy mulch of leaves or hay. In regions where the ground freezes the root should be dug up, trimmed back, and stored upright in damp sand or earth with the crown top exposed. After replanting in the spring a large, multi-branched stalk will emerge from the center of the plant with white flower umbels. Follow Bagging and hand pollinating information for carrots.

### **CHERVIL** (See separate listing for Turnip-rooted chervil)

Chervil is an annual which produces an umbel (flower head) of small white flowers that will reseed itself quite readily each year. It can over winter in the ground protected with a mulch of hay or leaves. But it dislikes the heat of summer and, without shade and abundant water, will often bolt to flowers early producing non-viable seeds. Chervil does not cross pollinate with turnip-rooted chervil and seed catalogues do not list any other varieties, so cross pollination is not a problem. Dried umbels shatter easily dispersing the seeds, and the primary umbel (the biggest one at the top) will often mature and shatter before the secondary umbels are dry so a daily hand harvest of the small oval seeds is necessary. Blow the chaff away and store in a cool, dark, dry place and the seeds will remain viable for 3 years.

Chervil seeds need light to germinate, so in the spring sprinkle them on the top of the ground and do not cover with soil.

**CHICK PEAS.** See Garbanzo Beans.

### **CHICORY.** Also Radicchio and Witloof.

Chicory is a self-incompatible biennial requiring two years of growth and pollination from another plant of the same variety to produce true-to-type seeds. Moreover, it will cross-pollinate with endive, other varieties of chicory and wild chicory. In mild climates it can stay in the ground over winter, and a light harvesting the first year will not harm seed production. In regions where the ground freezes dig the plants up before the first hard frost and trim the tips back to 2' (60cm). Harvest the secondary roots for the table, and store the main root in damp sand or soil for the winter. Replant in the spring.

### **BAGGING AND HAND POLLINATING.**

During the summer chicory will send up a branched stem of blue flowers 6' (185cm) tall. Keen observation of the plants behavior will allow you to detect just when a flower is about to open. Using old stockings and twist ties, bag closed flower heads on as many different plants as possible the night before they open. Early next morning remove bags and rub an artist's paint brush over the flower on one plant and then move on to do the same to a flower on another plant. Continue transferring the pollen from a flower on one plant to a flower on a different plant until all the open flower heads have been pollinated with pollen from another plant. Attach a bright coloured tape to the stems of the pollinated flowers so they are not harvested by mistake, and close the bags.

### **HARVESTING**

When the seed pods show, remove the bags and stop watering the plant to let the seed stalk dry. Squeeze the base of a flower head to monitor the seeds becoming hard and dry. If rain threatens, cut the entire stalk off and hang it upside down in a bag to dry away from direct sunlight. When the flowers are completely dry, break them off the stalk and store in a glass jar. The entire pod can be replanted in the spring, but will need thinning when the seedlings sprout. Alternatively,

put the dried flowers in a bag and beat with a hammer or base ball bat to release the seeds. Use a hair dryer, carefully, to blow the chaff away. Stored in a cool, dry, dark place the seeds will remain viable for 8 years.

### **CHINESE ARTICHOKE**

Chinese artichokes are cultivated by dividing the healthy plant tubers (roots) into their natural segments when they are dug up in the fall. Unwashed tubers store well in plastic food containers in the refrigerator to be replanted in the spring.

### **CHINESE CABBAGE**

Members of the Chinese Cabbage family include: Pac Choy, Mustard Greens, Celery Mustard, Chinese Mustard, Pe Tsai, Celery Cabbage, Spinach Mustard, Skantung Cabbage, Chihli Cabbage, and Mizuna.

All these members are self-incompatible and so must be pollinated by another plant of the same variety. They all cross-pollinate with each other so bagging and hand pollinating is necessary to save true-to-type seeds. A light harvesting of the leaves the first year will not harm seed production.

In milder regions some early varieties planted very early in the spring can be harvested for viable seed the same season. Alternatively, dig the plants up before the first hard frost, pack the root-balls, still surrounded with soil, in damp sand or soil with heads exposed, and store for the winter. Waiting to save the seeds from plants that flower last, rather than first, will produce the best seeds. Follow bagging, hand-pollinating and harvesting instructions for the Cabbage Family.

### **CHIVES.**

Chives are perennials that continue to grow for years naturally. They are best propagated by dividing the clumps or root bulbs in the spring. Replant immediately with lots of compost under them. There is no undesirable cross-pollination with other varieties, therefore saving the seeds is simple. Let the pink flowers dry on the plant. The seeds ripen slowly but the flower heads shatter easily dispersing the seeds so test every day by shaking the stalk, you will hear a rattle when the seeds have dried. Cut the flowers off and knock the seeds out onto a piece of newspaper. Let them dry another week or so to make sure there is no moisture in them, then store in the fridge. These seeds remain viable for a maximum of 2 years only.

### **CHRYSANTHEMUM (Edible)** Also known as Shungiku.

These do not cross pollinate with any of the non-edible varieties. When the yellow flowers loose their petals and the centers become brown and dry, they are ready for picking for seed. Gently crush the dried flower heads to loosen the seed and blow the chaff away. The seed is viable for 3 years stored in a cool, dry dark place. Sow seeds in spring in cool climates and autumn in warm regions.

The leaves of edible chrysanthemum are small in comparison to ornamental garden varieties.

When the leaves are regularly plucked, the plant grows to a compact attractive plant approximately 2' (60cm) tall The leaves are wonderful in stir fries, as a green vegetable gently steamed, and used in soups. The flowers are edible making a wonderful garnish for salads, soups and stir fries. The new leaves and tender shoots can be harvested continually.

### **COLLARDS**

Collards are self-incompatible biennials that will cross pollinate with all other members of the Cabbage family. A light harvest the first year will not harm seed production. When planted in the fall, in warmer regions, they will produce a seed head the next summer. In cooler regions they can stay in the ground over winter under a straw or leaf mulch. In regions where the ground freezes dig the plants up, replant in pots of soil and sit them in a cool place indoors for the

winter. They will rot after 1-2 months in a root cellar. Follow bagging, hand pollination and harvesting instructions for the Cabbage Family.

### **CORIANDER** (also Cilantro and Chinese Parsley)

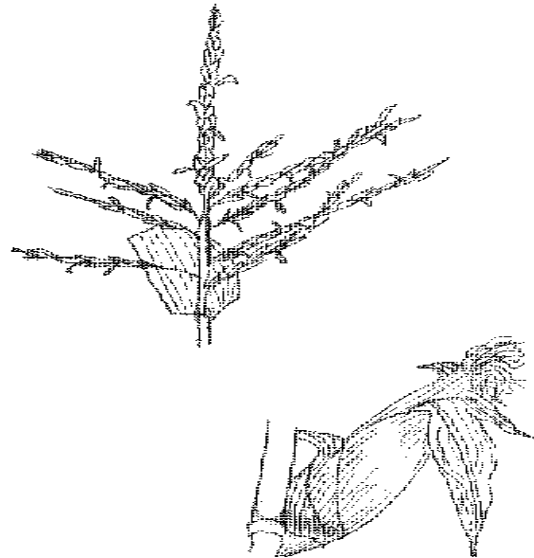
Coriander will not cross-pollinate with any other vegetables or herbs. While the seeds are green the plant often has an unpleasant odor and is almost inedible. As the seeds start to turn brown and hard the slightest disturbance will make them drop to the ground so daily harvesting of the umbels is necessary. Blow the chaff away, and dry thoroughly before storing in a cool, dark, dry place. The seeds remain viable for 3 years. Plant seeds directly into the ground in the spring in a place where they can receive lots of water.

### **CORN**

Corn is self-pollinating via wind. Avoid cross-pollination with other varieties and GE corn by bagging and hand pollinating.

#### **BAGGING.**

A green/brown tassel will emerge from the whirl of leaves at the top of the developing corn plant. If a tassel is bagged too soon it will stop developing and not produce pollen at all. Wait till the 'anthers' (tiny pollen bearing structures) start to emerge on the tassel. In the evening, grasp the stalk just below the tassel and give it a vigorous shake to rid it of any foreign pollen. Then pull all of the lateral branches upward and place a paper bag over the whole tassel. Twist tie the bag securely around the corn stem at the base of the tassel so that none of the powdery pollen can escape. Avoid the large amount of pollen that collects in the whorl of leaves just below the tassel, as it is usually contaminated. Corn is sensitive to inbreeding which produces a stunted, low yield, late bearing plant. So bag several tassels to ensure good diversity.



Look for the top ear beginning to form on the side of the main stem, as the plant feeds that one first

and aborts it last during drought. Tear the leaf that is covering the top ear off completely. Cut the tip off the husk leaves to expose the silks, which will look like a pea-sized circle in the center of the cut. Be careful not to cut too far down or the tip of the developing cob may be damaged.

Cover the whole ear with a bag, wedging it closed between the stalk and the ear.

#### **HAND POLLINATING**

Hand-pollinating is best done when the silks of the ears form a 1" (3cm) brush with a fairly even surface. If the silks are a lot longer, or are ragged and different lengths, just cut back the silks to form a 1" (3cm) brush. This won't cause any damage because the pollen doesn't enter the tips of the silks. Each strand of silk is receptive along its entire length, so the pollen can enter anywhere. Because each strand of silk represents one seed on that cob, all the strands need to be hand pollinated. Bend the bagged tassel over at a slight downward angle (but not enough to break the tassel or plant), give the tassel bag a couple of sharp whacks or vigorous shakes to dislodge as much pollen as possible. Unfasten the tie and, with the bag still held at a slightly downward angle, gently shake the tassel while pulling it out of the bag to dislodge even more of the pollen. Mix the pollen from several plants together in one bag to help maintain genetic diversity. The mix will contain bright yellow powdered pollen, a lot of dead anthers and often a few bugs. Remove the bugs. Make a small cut in one bottom corner of the pollen bag and shake pollen onto the silks. Shake on just enough so that the pollen is visible on the silks, probably about half a

teaspoon. Sprinkle it uniformly trying not to clump all of it in just one place. Cover the pollinated ear with a white (dark colours block the sun) polyester or Remay bag and rewedged it closed between the main stalk and the ear. Leave sufficient room in the bag for the ear to develop, but not so much that the wind will blow it away. The bag can be left on until harvest time to mark which ears are to be saved for seeds.

#### **HARVESTING.**

Ears of seed corn should be left on the stalk until husks are dry and white, if possible, usually about a month after the eating corn has been harvested. However, if rain threatens mature cobs can be removed, the husks peeled back and tied together and hung to dry under shelter away from direct sunlight and mice. To prevent damage, kernels should not be removed until both the cob and kernels are dry. In fact, some farmers claim that kernels stored on the cob last longer. Alternatively, rub two cobs together to remove the seeds from both. Remove any silks, cob debris, and seeds that are not completely formed, such as the small end kernels. Hit a couple of seeds with a hammer, if they mash they need further drying. If they shatter they are ready to be stored. Freezing kernels in an airtight jar for 2 days will kill any weevils and/or their eggs which are sometimes hidden in the seed coats.

**VIABILITY.** Seeds retain viability for one year only. One cob will render about 80 seeds.

#### **CORN SALAD.** Also Lamb's Quarters.

Corn Salad is insect pollinated. There are two varieties: Italian Corn Salad which has hairy leaves about 5" (12cm) long and grows to about 16" (40cm) tall, and Common Corn Salad which grows in rosettes 3-6" tall with either small or crinkled leaves. Italian Corn Salad will not cross pollinate with the Common variety. Any harvesting of the leaves will deplete the energy of the seeds to be saved. In warm weather the plant will produce blueish white flowers which beget the seeds. As soon as seeds start to drop to the ground, cut the stalk and hang it upside-down in a paper bag to dry. A vigorous beating of the bag should dislodge the small, yellowish brown seeds. Blow chaff away and store in a cool, dry, dark place. Seeds remain viable for up to 4 years.

#### **COWPEAS.** Also Southern Peas and Black Eyed Peas.

Cowpeas are self-pollinated and different varieties cross-pollinate via bumblebees, so bagging is necessary to produce true-to-type seeds. See **BEAN FAMILY** for instructions.

Seeds will maintain 80% germination for 4 years stored in a cool, dry dark place.

#### **CUCUMBER**

Be sure to start with open pollinated seeds rather than F1 hybrids. Cucumber varieties will cross-pollinate with each other, but the success rate for producing pure seed from hand-pollination is over 85% except when done during periods of drought or excessively high temperatures.

However, they are subject to diseases such as mildew, scab, mosaic, and anthracanen so save seeds from only the healthiest plants. See **SQUASH FAMILY** for instructions.

Sealed in an airtight container the seeds will remain viable for 5 years.

#### **DILL**

Once you have a plant in the ground it will self seed itself easily. Dill will not cross-pollinate with any other vegetables or herbs, but will cross pollinate with other varieties of dill. Therefore, without isolation seeds will produce a good healthy crop of dill, albeit with some small changes in characteristics. But if you absolutely need true-to-type seeds, place four 6' (185cm) stakes in a small group of plants. Tie the seed heads to the stakes, and slip a *Propagation Bag* (see **Bagging Methods** above) over the group with the stakes forming the top corners. Follow **Hand Pollinating** instructions for Carrots. Each plant will produce several flower clusters which should be left to dry to a light brown colour on the plant. The seeds shatter from the heads very easily so

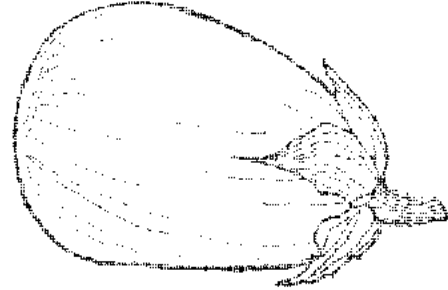
pick fully mature, dry flower clusters with slightly green stems. Rub them gently between your hands to free the seeds into a bag. Any small stem pieces can be gently blown away, and the seeds dried and stored. Dill seeds maintain 50% germination for five years if stored in the fridge.

## EGGPLANT

The easiest way to propagate eggplant is to take cuttings. Put the cut ends into a jar of water on the windowsill until roots appear, then replant in the spring.

Eggplants are self-pollinating but small bees can occasionally cross-pollinate the different varieties. To save seeds, begin with an early bearing variety started indoors and transplanted outdoors very carefully as soon as frosts have passed.

Using an old stocking, cover an unopened flower head and twist tie it closed around the stem. Remove the bag after the fruit is visible. Keep the eggplant fruits off the ground during ripening, since they rot when left to rest on the ground. Leave the fruit on the plant until well past the eating stage. When their colour becomes a dull unattractive yellowish brown it is ready to be harvested for seeds. Seeds saved from immature or ready-to-eat eggplants will not be viable.



To extract the seeds, mash and squeeze the fruits thoroughly with lots of water, or use a food blender on slow or with a blunt blade. The small, brown slippery seeds that sink to the bottom are the viable seeds to be saved. Any other seeds amidst the floating pulp are not viable and should be drained off with the pulp. Rinse the seeds well and spread them out on a shiny surface or cookie sheet to dry for a few days in a dark, dry, airy place. Stir the seeds every day to prevent them clumping together.

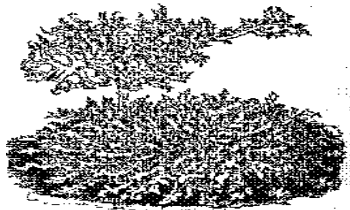
Eggplant seeds will remain viable for 5 years if stored in the fridge in an air-tight container.

## ELEPHANT GARLIC

Elephant garlic does not commonly produce seeds. Break healthy bulbs apart and replant the individual cloves separately.

## ENDIVE

Endives are biennials. However, if the seeds are sown in the cool temperatures of early spring they will bolt to seed the first season and the seed will be viable. But usually, in mild winter



regions endives are planted in the fall to over-wintered in the ground under straw or leaf mulch. In climates where the ground freezes, dig the roots up before the first hard frost and trim the tops to 2" (5cm) above the crown. Clip off any small or secondary roots, and store the roots in soil or sand at 32°-40°F. and 80-90% humidity.

Replant the roots in the spring. While chicory will cross pollinate with endive, endive will not cross pollinate with chicory, or anything else so isolation is not necessary to save true-to-type seeds. As summer temperatures increase the plants will begin to produce 4' (120cm) seed stalks of blue flowers that may need to be staked and tied for support. Harvesting leaves during the season will decrease the energy of seeds produced. When the stems of flowers become seedpods, stop watering the plant and let the stem dry. If you crush the base of the dry flower and the seeds appear dry and firm they are ready for harvest. The individual seeds are tightly enclosed and difficult to remove. You can either, put the brown pods in a sack on a concrete floor and beat with a hammer or wooden maul to break seeds free, or break the dry seedpods off of the stalks one at a time and store in a small glass container without further cleaning. The entire pod can be planted in the spring but will require thinning when seedlings

appear.

Endive seeds remain viable for five years when stored in a freezer.

Seeds that take a long time to germinate in the spring usually produce plants that bolt too early.

**ESCHALLOT** Also called Potato Onions and Multiplier Onions. Not the same as Shallots. Eschallots multiply on top of the ground rather than under it. Pull them from the ground at harvest time, separate and spread them on a tarp or sheet in the shade to cure (dry). These onions are normally propagated by simply replanting each bulb individually to multiply again the next year.

### **FENNEL**

There are 3 different varieties of fennel: Florence, Sicilian, and North American Wild. Garden Fennel is very different from wild fennel. All varieties will cross pollinate with each other so follow the seed saving methods listed under Carrot. Stored in a fridge seeds will remain viable for 3 years.

**GARBANZO BEANS.** Often called Chick peas.

Garbanzo flowers are self pollinating, but honeybees frequent the flowers and cross-pollination is common. Follow BEAN FAMILY instructions for bagging, harvesting and storing seeds.

However it should be noted that whenever garbanzo plants are touched they deposit malic acid on clothing and skin. This can often cause rashes and skin irritations. Use gloves.

### **GARLIC**

Garlic does not commonly produce viable seeds. When the plant turns brown pull it out and leave, with the dirt on, to cure in a shady, airy place for a few days to stop mildew. Next spring break apart and replant the large individual cloves separately.

### **GARLIC CHIVES**

Garlic Chives do not cross-pollinate with common chives or any other alliums (onions). They are best propagated by dividing and replanting the clumps, every second year. Simply dig the plant up, separate the rhizomes with a sharp knife, and replant each one individually.

To save the seeds, allow the umbels to dry thoroughly to a brown colour with black seeds showing. Crush the seed heads into a bowl, blow chaff away and store in the fridge in a ziplock bag. However these seeds are short-lived and should be planted within 1 or 2 seasons.

### **GINGER**

Rarely seen, ginger plants can be grown in warmer climates by cutting their root rhizomes into their natural sections. Set them aside for a few days to heal, then as soon as the ground warms plant the individual rhizomes into a rich soil. Ginger plants grow to about 3' (90cm) tall and can be harvested about 8 months after planting.

**HONEYDEW MELONS,** See Melons.

### **HORSERADISH**

Horseradish does not produce seeds. It is usually propagated from root cuttings during the dormant winter period. Dig the plant up before the first hard frost and harvest the large root for the table. The side shoots and crowns can be replanted immediately in mild regions, or stored in damp sand for the winter and replanted in the spring.

### **HYACINTH BEAN**

A wide variety of insects are attracted to hyacinth bean flowers so cross-pollinating is common. See BEAN FAMILY instructions for seed saving methods. Each pod contains 4-6 beans that can

be black or dark red with a white stripe. Harvest when pods are light brown and shriveled. Dry thoroughly and then freeze for 48 hours to kill any weevil eggs that may be under the bean coats. Beans remain viable for 3-5 years.

**JERUSALEM ARTICHOKE** Also called Sunchoke.

Although most Jerusalem artichoke varieties will flower, the seed produced is usually sterile. The plants are usually propagated vegetatively. Each year the plants need to be dug up to have their root tubers divided and replanted. The best tubers are the less knobby ones. In areas where the ground freezes, they can be dug up and stored in damp sand for several months at 32°-40°F. at about 90% humidity, and replanted in the spring. If they become dry for very long they will shrivel and dye. Planted in a line they make a great wind-break.

**KALE.** (Except Siberian Kale, Hanover Salad, and Rape)

Kale is a self-incompatible biennial that will cross pollinate with all other members of the cabbage family. A light harvest the first year will not harm seed production. When planted in the fall, in warmer regions, it will produce a seed head the next summer. In cooler regions it can be kept in the ground over winter. In regions where the ground freezes dig the plants up, replant in a pot of soil and sit them in a cool place indoors for the winter. They will rot after 1-2 months in a root cellar. Follow bagging, hand pollination and harvesting instructions for the Cabbage Family.

**KOHLRABI.** Both white and purple varieties.

Kohlrabi is a self-incompatible biennial. In warmer regions, plant in the fall to over winter in the ground. In cooler regions plant in the spring, dig it up after a good frost, trim off the leaves and store in damp sand or soil for the winter. Replant in the spring, In its second year of growth it will produce a dome of yellow flowers which will empty the main bulb of its substance. Follow bagging, hand pollination and seed harvesting for the cabbage family.

**KORILA**

Leave late summer fruit on the vine and Korila will reseed itself. You may need to thin the seedlings out or the vines will eventually smother all other plants.

Korila will not cross pollinate with other members of the Squash (Cucurbit) family. The black turtle shaped seeds can easily be removed from the fruit to dry for a week or so before storing in a cool, dry, dark place for the winter. Seeds remain viable for 2-3 years.

**LAMB'S QUARTERS.** See Corn Salad

**LEEKs**

There are two kinds of Leeks: Those propagated by seed, and multiplying leeks. Simply divide the clumps of Multiplier Leeks into individuals at harvest time, trim down the roots and leaves and replant.

Seed bearing leeks are biennial and will cross pollinate with other leeks, but not with other members of the onion family. In regions where the ground does not freeze they can be left in the ground all winter, hilled up with soil. Over the winter they will produce bulbets around the base. These can be planted in the spring to start a new crop faster than by seed.

If some variations in characteristics are acceptable, the 4' (120cm) tall flower stalk produced in the second year of growth (which will not need staking) will produce black seeds within a papery capsule. If true-to-type seeds are required then stake the seed head and slip a *Propagation Bag* (see Bagging Methods above) over the group of plants Cut individual capsules into a paper bag when fully dry, rub the heads between hands, and blow the debris away. Stored in a sealed container in the fridge seeds remain viable for 2-3 years.

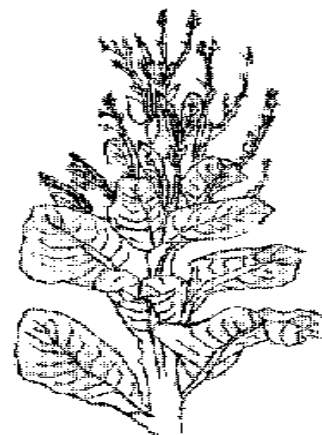
## LEMONGRASS

Usually lemongrass is propagated by dividing clumps of roots. Dig well established clumps up, trim back leaves and long roots, and divide into individually rooted plants. Replant about 1' (30cm) apart and keep well watered until established.

## LETTUCE

Lettuce is self-pollinating and studies show that there is only 0-5% cross pollination between varieties grown side by side. A distance of 12 feet (370cm) between varieties is recommended to prevent this possibility. However, cultivated lettuces can also cross with wild, or prickly lettuce. If wild species exist in the area of your garden, you can either cut them down or wrap your seed heads with polyester or cotton batting just before flowers open and then remove it again when plants stop flowering and begin to dry. It is unwise to save seeds from plants that bolt to seed early. Wait to save seeds from plants that produce well during the season and bolt late. Seed stalks will often need to be tied to a stake for support.

Most lettuce varieties begin to produce flower heads when temperatures become hot. However, head lettuces need to be either slit across the top, or have the outer leaves peeled back, to allow flower stalks to emerge. Outer leaves can be harvested from lettuce plants without affecting the quality or quantity of seeds produced.



Lettuce seeds ripen into plump brown pods irregularly from 12 to 24 days after flowering. To harvest the greatest amount of seed, shake the seed heads into a large paper bag every day during that period. Label the bag for easy identification. If rains threaten, or daily harvesting is not possible, the entire plant can be cut and placed head first into a paper bag. Be sure to leave room in the bag for air circulation to prevent mildew. When the seed heads are totally dry, shake vigorously within the bag, or rub seed heads between your palms. The seeds are tightly packed together in pods which break apart easily, but there is almost as much white feathery chaff as seeds. You can grasp a pod tightly in one hand, and gently tear the feathery tufts off all at once with the other hand, the seeds will then slide freely out of the papery pod. A little chaff does no harm in storage but it's best to remove as much as possible, along with the thin, flat, unpollinated seeds. Seeds remain viable two to three years when stored in a sealed container in a cool dry dark place. One plant can yield up to 60,000 seeds.

**LIMA BEANS** Often called Butter Beans or Potato Limas.

The large-seeded perennial Lima Beans grow from a root each year, unless a frost kills it. Both large and small seeded limas will cross-pollinate with one another, thus bagging is necessary to produce pure seeds. See BEAN FAMILY for bagging instructions.

Both bush and climbing lima pods that are left to dry on the vine shatter easily. To prevent losing seeds, pick individual seedpods by carefully closing your hand around it on the vine and crushing it into a paper bag. Pods can be picked when fully mature but not yet dry. But do not pick while pods are still green, wait until they rattle when shaken. Spread the pods out and allow them to dry as quickly as possible before shelling. Continue drying the shelled beans until seeds shatter when hit with a hammer. Freeze them for 48 hours in an air-tight container to kill any weevil eggs in their coats before storing them in the fridge for the winter.

Lima beans will remain viable for 3-5 years.

Some older varieties may contain high levels of dangerous cyanogenic glycosides. These can be counteracted by soaking the beans, boiling, draining and peeling off the skins.

## **LUFFA**

Grow Luffa on a trellis or over the garage. Fruit that is left to dry on the vine will split, but the seeds will be held in the dry inner sponge-like fiber. Shake out the seeds, dry, and store in a cool, dry, dark place. They will remain viable for about 5 years. The fruit's inner fiber can then be added to curries, cooked with meat, or bleached in the sun and used as a body scrub in the bathroom.

## **MAJORAM**

Usually propagated from root cuttings. Simply drop the raw end of the cutting into a jar of water on the windowsill until roots are established, and then replant.

## **MELONS.** Honeydew, Muskmelons, Cantaloupe, Rockmelons.

All melons will cross-pollinate via insects with all other melons, but not watermelons, squash, cucumbers or pumpkins. Melons abort 80% of their female blossoms, and hand pollination is even less effective than insect pollination. There is no way to tell which flowers the plant is going to abort, so only about 10-15% of the hand-pollinated blossoms will develop into fruits. The flowers are very small and it is difficult to detect which ones will open the next day. However, if you are willing to experiment, follow SQUASH FAMILY directions. The first female flower is the most likely one to set fruit. Store the seeds in an airtight container in a place where rats cannot push it to the floor to break it open and eat the seeds. They love Melon seeds.

## **MINT**

Mint is a perennial that needs to be grown in wet places. It is best grown from cuttings as there are many varieties and all will cross pollinate with each other. Simply cut a small branch from a healthy plant, put the raw end in a jar of water on the windowsill until it establishes a root system, and replant it.

## **MITSUBA** Also known as Japanese Parsley

A hardy annual which self seeds readily, Mitsuba grows well all year round in a warm climates. In cooler climates it over-winters in the ground. In the summer the plant sends up a lot of thin stalks with tiny flowers which quickly turn to seed. Cut the stalks when the seed heads turn brown, then rub them gently between your hands to release the seeds. The seed remains viable for 3 years.

## **MUSTARD**

There are two kinds of Mustard: Black Mustard which grows 10'-12' (300-350cm) tall, but is rare these days, and White Mustard which is shorter. Both are annuals which do not cross pollinate with other members of the Cabbage Family, but will cross with wild mustard. During the summer Mustard plants send up a tall multi-branched stem of yellow flowers. For true-to-type seeds cover this stem with a bed sheet or *Propagation Bag* (see Bagging Methods above) before the flowers open. Remove the bag after the flowers have finished and green seed pods are visible. Green pods will form and mature from bottom of the stem upwards. Seed pods shatter easily so hand harvest daily or cut the whole stalk off at the ground when the pods turn brown and hang upside-down to dry. Crush the pods into a bowl and blow the chaff away. Stored in a jar in the cupboard the seeds remain viable for 3 years.

## **MUSTARD GREENS.** Also called Indian Mustard and Kai Choy

Mustard greens can propagate lots of weeds if their bright yellow flowers are let go. It is a self-pollinating annual which will cross-pollinate with Chinese Mustard. Follow instructions for the Chinese Cabbage Family.

## **NASTURTIUM**

Nasturtiums are best started from a cutting taken from a plant that is not flowering or in seed at the time. Drop the raw end of the cutting into a jar of water on the windowsill until roots become established, and then replant it.

## **NEW ZEALAND SPINACH**

While New Zealand has three different varieties, in North America only one has been offered by seed manufacturers. All varieties are best propagated by cuttings. Alternatively, since it is self-pollinating and there are no other varieties for it to cross-pollinate with, it will self-seed safely, or seeds can be saved without bagging. New Zealand Spinach seeds ripen progressively along the length of the vine from bottom to top. The seeds turn brown when mature and often fall off the plant and are difficult to see on the ground. Although picking the individual seed pods off of the vine is time-consuming no further treatment of the black seeds is necessary. Simply spread on a shiny surface to dry. Seeds will maintain 50% germination for five years when stored in a fridge. The large, green, horned seeds can be difficult to germinate. Soaking seeds overnight will help.

**OKRA** Also called Gumbo, Bamiyas and Lady's Fingers.

Self-pollinating Okra will cross-pollinate with other varieties so bagging is necessary. Pieces of nylon stockings, row cover or landscape cloth easily adapt to bagging individual okra blooms.

Try to save seeds from the first few flowers of 2 different plants for diversity. In the late afternoon or evening bag the okra flower that is ready to open the next morning. The flower will be fat, with a light green striped appearance, and may also be starting to show some colour. The bag must be secured using a plastic covered twist tie, drawstring, rubber band, or masking tape, making sure that insects are unable to wiggle inside. Do not remove the bag till the second day after the flower has opened, and remember to tag the blossom with coloured yarn or similar to be sure it is not eaten by mistake. Further fruit production from these plants will then slow down, but will return to normal next season.



Green okra plants often cause skin irritations, but dry pods are downright nasty. ALWAYS WEAR GLOVES when harvesting and cleaning okra pods. Still green but fully mature pods can be picked and left to finish drying away from direct sunlight until they split open. Wearing gloves, break each pod open from its apex, like peeling a banana, and let the grey seeds fall into a bowl. Dry pods can also be put into a pillow slip and jogged up and down on to break the pods open and free the seeds. Remove any crushed pieces of pod and dirt with a hair dryer.

Okra seeds will maintain 50% germination for five years when stored in a fridge.

**ONIONS.** Other than Leeks, Multiplier Onions, Walking and Tree Onions.

Most members of the onion family are biennial, requiring two seasons of growth to produce seeds. Occasionally they do seed in the first year, but this seed is not viable. They are unable to self-pollinate, and cross with other members of the onion family via insect activity. Follow Bagging and Hand-pollination instructions for Carrots.

## **ORAGANO**

Best propagated from root cuttings. Simply clip off a small healthy stem, pop the raw end into a jar of water on the windowsill until it sprouts roots and then plant it in the herb patch.

## **PARSLEY**

In warmer climates parsley can bolt to seed the first year and the seeds will be viable. In fact, if the plant is happy where it is, it will reseed itself. But otherwise it is a biennial that can be lightly harvested during the first year without harming the quality or quantity of the seeds to be saved.

All varieties can be over-wintered in the ground as parsley will tolerate below zero temperatures when covered with 2-3" (5-8cm) of straw or leaf mulch. Alternatively, it can be cut back and stored in a container of earth or sand with their crowns exposed, where a temperature of 32°-40°F. can be maintained all winter. Replant the next spring.

Curly leafed parsley can cross-pollinate with plain leafed varieties via insects. If this happens the next generation may have characteristics that are a combination of both varieties. But it will still be parsley. For true-to-type seeds follow the Bagging instructions for Carrots.

Parsley seeds can take up to 20 days to germinate as they have a germination inhibitor in their coats. For faster germination this can be dissolved by soaking the seeds in warm water for 2 days just before planting. Change the water a few times, and rinse before planting.

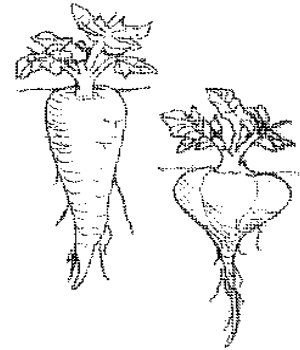
Seeds will maintain 50% germination for three years when stored in a fridge.

## PARSNIP

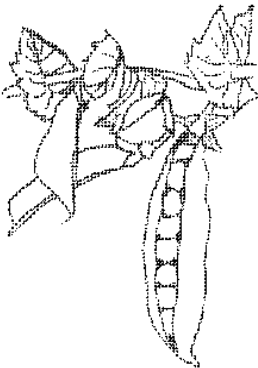
Parsnips should be harvested with caution, as the juice exuded from their stem and leaves can cause serious skin rashes. Keep hands away from face.

Some books claim that parsnips left in the ground during the winter become poisonous. However, the United States Department of Agriculture has investigated many such claims and found that in all cases the poisonings can be traced to *Cicuta*, a water hemlock that closely resembles parsnip in appearance.

Parsnips are a biennial. They over-winter very well in the ground in most regions, and develop a sweet, delicate flavor after exposure to freezing temperatures. In areas that have extremely cold winters the roots can be dug up, the tops trimmed back to 2-3" (5-8cm), and stored in sawdust, leaves or sand, between 32°-40°F. at 90% humidity. Replant in the spring. Parsnips will cross-pollinate with other varieties and wild road-side parsnips, so follow bagging and hand pollination instructions for carrots. The seeds will only remain viable until the next spring, and are very difficult to germinate.



**PEAS.** Including Snow varieties.



Peas are self-pollinating and do not readily cross-pollinate. Allow pods to reach full size before harvesting the seeds. Ideally, pick pods after they have dried on the vines and rattle when shaken, usually about 4 weeks after harvesting for the table. Pea seeds are susceptible to mold if wetted by rains after drying. If peas have reached full size, and rains threaten, the plants can be pulled up and hung to dry in an airy place indoors. Stored in a paper, cloth, or poly bags, rather than a sealed container, seeds will remain viable for 2 years. Shriveled seeds are less viable.

## PEANUTS

Peanuts are self-pollinating annuals, but bees will cross-pollinate them with other varieties. In the late spring plant the peanut, in their shells, in hills the same as potatoes. Before the flowers open cover the plants with a bag made of Landscape Cloth or Row Cover to keep the bees away. The flowers produce several 'ovaries' which will grow down into the soil to form seedpods under the ground – which are the 'peanuts' we eat. When the leaves turn yellow pull the plants out and lay to dry upside down in the sun for 1-3 weeks. If rain threatens bring them indoors to continue drying in as much sun as possible. Stored in their shells, in ziplock bags in the freezer they will remain viable for 4 years – if the kids don't eat them. The tender shoots and leaves can

also be eaten as a vegetable.

**PEPPERS** . Including Sweet, Chili, Tabasco, Capsicum, and Squash Peppers.

Many commercially available peppers today are FI hybrids, so be sure your beginning seeds are of an open pollinated variety. Peppers are annuals, and are quickly killed by frost. In general, the hotter the variety the more tolerant it is to cool, wet weather. In colder areas pepper plants can be dug up in the fall and transferred to a pot of soil in the green-house or indoors for the winter.

When the soil warms in the spring the plants can be set back out in the garden. In this way your plants will keep producing year after year.

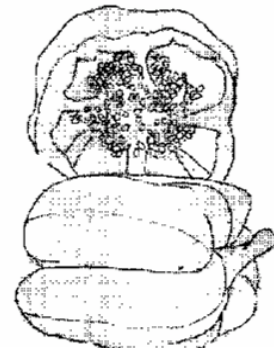
Alternatively, peppers are self-pollinating, but some bees and insects will often cross-pollinate varieties within the same species. Usually, seeds of sweet peppers that cross with hot will usually produce hot peppers. Bagging is needed to produce true-to-type seeds.

**BAGGING:**

During the evening choose a healthy plant with well formed fruit that has a branch of new unopened flowers on it. Place a tiny stocking, spun polyester, or Remay bag over the blossoms, and twist tie a bright coloured ribbon on the flower stem. If a fruit forms the ribbon will identify it for seed saving. The bag and ribbon will fall off with the aborted flower if the fruit fails to form, which often happens.

**HARVEST:**

Use CAUTION! The oils in hot peppers can be very painful, especially to eyes and mouth! Work in a well ventilated room. Additionally, plastic buckets and instruments are often used as some of the fruit's acid will discolour metal surfaces. Harvest pepper seeds when the fruit is fully ripe to the point of becoming wrinkled. If rain threatens bring the peppers indoors to finish ripening in a warm place. Cut the fruit into sections, scrape the seeds out into a bowl, add water and stir. Very hot peppers can be whirled in a blender on slow with a little water. The ripe seeds will sink to the bottom, while the flesh and unripe seeds will float. Pour off the floating pulp and seeds and add more water. Repeat this process until only the good seeds at the bottom remain. Pour the seeds into a strainer and wipe the bottom of it on a towel to remove as much moisture as possible.



Spread the seeds out on a shiny tray, such as a cookie sheet, to dry in a dark place. Do not use paper towels as they stick to the seeds and are difficult to remove. Stir the seeds daily to be sure they dry evenly. If seeds bend instead of breaking additional drying time is needed. Place dried seeds in an air-tight container and store in the fridge or a cool, dry, dark place. Wash your hands thoroughly with hot soapy water after harvesting since pepper residues will burn eyes and lips for quite some time after contact!

Pepper seeds maintain 50% viability for at least two years.

### **PERUVIAN PARSNIP**

Peruvian Parsnips flower but rarely produce any seed. Propagation is usually by offsets. In the spring trim the parsley-type leaves back and dig up the whole plant. Slice into salads, steam or bake the large root bottoms, make soup of the central bowl, and cut the offsets into separate crowns. Set them aside to harden for a few days then replant. They are extremely hardy and will reshoot even when they look quite dead. Ten months after planting the roots will be ready for harvest again.

### **POTATOES**

Potatoes are usually grown from tubers of seed potatoes (the actual potato), but cuttings from potato plants can also be taken, rooted, and replanted. However, they are soil specific, so seek out local stocks rather than transport them from one region to another.

The best potatoes for winter storage are medium to large sized late varieties. After curing (drying the skins), pack the tubers in baskets or boxes and store in a dark well ventilated place to replant next spring. Avoid storing them near apples. Potatoes will keep for 4-5 months when stored between 32°-40°F. and 80-90% humidity. Give germinating potatoes 24 hours of light before planting.

Unfortunately, viral diseases and root knot nematodes are often carried on tubers. These diseases and pests can usually be eliminated by planting the tubers in a large pot of sterile potting mix. Let the shoots grow 6-8" (15-20cm) tall and then cut them off at least 2" (5cm) above the soil line. Do not allow the growing shoots to bend over and touch the soil, and never let the cut shoots come in contact with the soil. Plant the shoots in a new container filled with previously unused sterile soil. The original tuber and potting medium should be burned to prevent contamination or disease transmission. The new shoots will root in about 10 days and can be planted into the garden as soon as a good root system has formed, or be maintained in a cool greenhouse for up to a year.

**PUMPKIN.** Follow directions for Squash.

### **RADICCHIO.**

Radicchio is the common name for red chicory, which is just one of the many varieties of chicory. To save radicchio seeds follow directions for chicory.

### **RADISH**

The round summer varieties are annuals, producing seed in their first season. The black winter varieties are biennials which will need to be wintered over. They both produce lots of seed pods, so some of the green immature pods can be harvested to add to curries and pickles. Follow bagging, hand pollinating and seed harvesting instructions for the Cabbage Family. The mature dry pods usually need to be crushed with a rolling pin or hammer to release their seeds. But be careful not to split the seeds. Seeds will remain viable for 4 years stored in a ziplock bag in the fridge.

### **RHUBARB**

Rhubarb plants produce both flowers and seed stalks, however the seeds do not produce plants that are true-to-type. When rhubarb seeds are planted a wide variety of plant types will result that may or may not look anything like the parent plant. So cut off any seed stalks that do emerge, diverting the plant's energy to stem production.

To propagate rhubarb simply dig the plant up every 3-5 years during the dormant winter period. With a sharp knife, divide the root ball into segments with an eye shoot off each one, and the replant them separately. A good rhubarb plant will produce well for 20 odd years.

**ROCKET.** See Arugula.

**RUNNER BEANS.** Scarlet Runners, Seven year and Butterfly beans.

Runner bean plants are perennials that need strong poles to climb. A light frost will kill their foliage to the ground. Each spring they sprout from tuberous roots which are poisonous if eaten. In areas where the ground freezes the roots can be dug up in the fall, stored over winter in slightly damp sand and replanted in the spring. Vines that grow from tuberous roots produce flowers much earlier in the season than those started from seeds.

Runner beans are of a different species to other beans. The two species are easily distinguishable as runner beans climb in a clockwise twine, whereas all other beans twine counterclockwise. When assisting the young plants on poles you need to remember this or vines will either break, or fall off of the pole, if twined in the wrong direction.

While runner beans do not cross-pollinate with other beans, there is considerable cross-pollination between different varieties of runner beans so bagging is necessary to obtain true-to-type seeds. Runner bean flowers are not able to self-pollinate without being 'tripped'. Bag the flowers according to BEAN FAMILY instructions before the first blossoms begin to open. When each flower opens remove the bag and 'trip' the flower by depressing the bottom part of each flower and replace the bag.

Continue to follow BEAN FAMILY instructions, but take extra care not to break the large brittle seeds. Runner beans will maintain 50% viability for three years if stored in the fridge.

**RUTABAGA.** Also Siberian Kale, Swede, Rape, Hanover Salad and Finish Turnip.

Rutabagas are self-fertile biennials that will cross-pollinate with turnips and rape. They can be over-wintered in the ground under a straw or leaf mulch in most regions. In regions where the ground freezes dig the bulbs up after a few frosts, trim the tops down to about 2" (5cm) and store in damp sand or soil for the winter. Replant in the spring. During its second year of growth rutabagas will send up a 3' – 5' (100-150cm) seed stalk. Follow bagging, hand-pollinating and seed harvesting instructions for the Cabbage family. Seeds will remain viable for 5 years stored in a ziplock bag in the fridge.

### **SALSIFY**

Salsify can bolt to seed the first year in warmer climates. In milder regions roots can be wintered over in the ground under a leaf or straw mulch. In regions where the soil freezes store a few of the best, smooth, straight roots for replanting in the spring. Be sure that the garden bed where they are to be replanted was manured an entire year beforehand, as any fresh manure will cause the roots to split. In its second season of growth Salsify will sprout a round, branched stem with a succession of purple thistle-type flowers that only open for a few hours each day. As the fluff in each flower turns white cut it into a bag, beat with baseball bat to release the seeds and blow the chaff away with a hair dryer. Stored in an airtight container, seeds remain viable 3-5 years.

### **SEA KALE.**

Sea Kale is a perennial that will cross pollinate with other varieties so it is best propagated vegetatively. Moreover, when it is grown from cuttings it will be ready to harvest 1-2 years sooner than when grown from seed. To save true-to-type seeds follow instructions for the Cabbage Family.

**SHUNGIKU.** See Chrysanthemum.

**SIBERIAN KALE.** See CABBAGE FAMILY.

**SNAKE BEANS.** See Yard Long Beans.

**SNOW PEAS.** See Peas.

**SORREL** Also called Sour Duck.

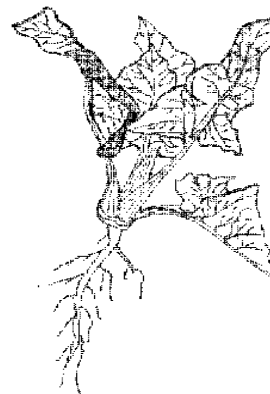
Sorrel is best propagated vegetatively by digging up a healthy plant in the fall, cutting the clump into separate smaller clumps, and replanting them individually to begin growing several fresh plants. The sunnier the site you replant it in, the more acid the leaves will be. After maturity Sorrel also forms flower heads which will cross-pollinate with the two other varieties of Sorrel both of which grow in the wild. To save true-to-type seeds follow instructions for the Cabbage Family. Cut the whole stalk off when the seeds turn light brown, and hang in a bag until dry. Do not let seeds stay on the plant till dark and dull or they will be spoiled. Seeds will remain viable for only 2 years stored in the fridge.

## **SPINACH**

Spinach will cross-pollinate with Beets and Swiss Chard so follow instructions for BEET FAMILY to save true-to-type seeds.

Additionally, it is best to save seeds from plants which are the last, rather than the first, to bolt to flower. Some of the outer leaves can be cut for the table without decreasing the quality of seed production.

Spinach seed will retain 50% germination for 5 years when stored in the fridge.



**SPRING ONIONS.** Also Shallots, Scallions, Japanese Bunching Onions, Green Onions.

These onions are all perennials that develop a cluster of little white bulbets at the base of each plant. They are best propagated by pulling the side bulbets off, without pulling the whole clump out, and replanting them individually. Alternatively, the whole clump can be dug up during its winter dormant period, the tops trimmed, and the bulbets divided into individual onions. Store for the winter in a cool dry, dark place. When replanting in the spring, make sure that each one has a root structure intact.

**THE SQUASH FAMILY.** Including the following:

Melons Cantaloupe, Casaba, Honeydew, Muskmelon, Pocket Melon. Cucumbers.

Squash - Banana, Buttercup, Hubbard, Turban, Cushaw, Butternut, Cheese pumpkin', Acorn, Summer Squash, Zucchini, Small Gourds, and Pumpkin.

All the above squashes, melons etc. are insect-pollinated and so cross pollination is common.

Therefore bagging and hand-pollinating is required to save true-to-type seeds.

### **BAGGING**

Be sure to start with open-pollinated seeds, rather than the more common F1 hybrids which produce only sterile seed. Each plant produces both male (usually the first flowers to appear) and female flowers. The female flower has a green bulge just below the blossom that, if pollinated, grows into the fruit. The male flowers have a straight stem with no bulge. Large squash bulges are easy to detect, but melons and cucumber are smaller so a little more difficult. Flowers that have already opened and wilted are past the pollination stage. Closed blossoms that begin to show some colour along their seams are almost ready to open. Usually the next flower back along the vine from the female will be a male that will also open that morning. The unopened male and female flowers that appear ready to open must be bagged with the toe section of an old stocking or taped shut with good quality masking tape. Stick only the edges of the tape ends together so that they can be easily untaped next day and then retaped back together again. Use an extra sticky brand of tape as morning dew will sometimes cause cheap brands to burst open. Tag these flowers with bright coloured yarn so that they can be found again next day, and not eaten by mistake.

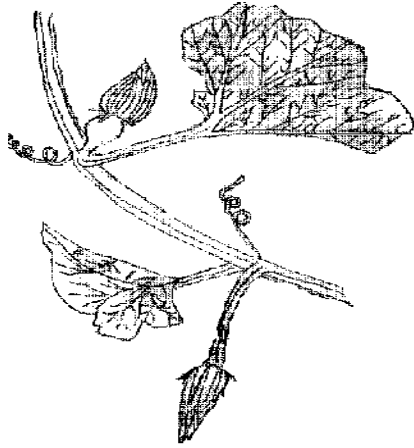
### **HAND POLLINATING:**

When the bag or tape is removed the next morning, the flowers that are ready will pop right open. If they do not, they are not quite ready, so retape them closed and try again the next morning when the dew has dried. Pick the male flower with a long stem attached. Remove the tape from the male blossom and carefully tear off all its petals. The small, round, ridged, structure in the center of the male flower should look like a tiny fuzzy yellow ball. Any male flowers which do not have this are not sufficiently mature for pollination. Now, gently remove the tape from the female blossom, which will slowly open. Hold the petal-less male flower as if it were a paint-brush and gently rub the fuzzy yellow pollen onto each section of the stigma of the female flower. Pollination will be more successful if several male flowers are used to

pollinate each female flower. Retape the female flower closed. Sometimes an especially brittle flower will split along the large petals that run from the tip of the flower to the tiny fruit bulge. If that occurs keep taping the flower closed closer and closer to the fruit until the hole flower is covered. The entire blossom can be covered with tape and the technique will still work. Be careful, however, not to damage the small, sensitive neck between the tiny fruit bulb and the base of the flower, which will cause the fruit to abort.

#### HARVESTING:

SQUASH should be fully mature before harvesting. For summer and other soft squashes, this is well past the eating stage. Harvest when skins are hard and leathery. Store the unopened fruits



for a further 20 days before removing the seeds. This is because some squash family seeds gain in size and viability for 20 days after harvesting. After the 20 day waiting period has passed, cut the fruits open and remove the seeds to prepare them for storage.

MELONS should be fully ripe before they are picked, as some will not complete ripening of their seeds if they are picked too soon. Harvest melons only after the curly vine tendril nearest the individual melon in question has dried and withered. Muskmelons (known in North America as cantaloupe) will slip from their stems when ripe. Eat the fruit and save the seeds. Clean and dry the seeds as directed below.

PUMPKIN, WATERMELON and GOURD seeds are

perhaps the easiest to harvest. Simply remove them when the ripe fruit is eaten. Clean and dry as directed below.

#### FERMENTATION:

SQUASH seeds can be fermented for higher germination and better disease-resistance.

CUCUMBER seeds must to be fermented as each seed is covered in a clear gelatin which requires fermentation to remove.

First the fruits must get very mature, so do not harvest until fruit have turned from green to yellow or orange, and is quite soft. Scoop the seeds out into a container (a clean, recycled plastic container is a good choice) and add just enough water to cover the seeds. Place the container in a warm dark place for at least three days, stirring twice a day, until the contents begin to smell rather rank. Some mold may form. Good seeds will sink to the bottom of this mess and empty seed coats will float. When it's all quite thoroughly nasty, add more water and pour off the floating debris. Repeat the process until only clean seeds remain on the bottom.

#### DRYING:

All members of the Squash Family. Pour the seeds into a strainer, rinse thoroughly rubbing them between your fingers under water to remove attachments, pulp, and naturally occurring gel from their coats. Turn them out to dry on a rigid surface such as plastic, glass, ceramic plates, or cookie sheets. Do not use paper towels as they stick to the seeds. Dry away from direct sunlight, and do not use the oven as seeds are damaged when dried above 95°F. When seeds break in half, rather than bend, they are dry enough to be stored in an airtight container in a freezer.

#### VIABILITY:

Melons, pumpkins, and squash seeds stay viable at least six years in storage.

Cucumber seeds, properly prepared and stored, can stay viable up to ten years.

#### **SWEET POTATOES** Also called Kumara, or Umara

Sweet potato information is exactly the same as for Potatoes. Alternatively, store undamaged tubers over the winter wrapped in newspapers. Allow them to sprout in the early spring and then cut them into pieces with one sprout on each piece. Replant each sprouted piece directly into the garden as soon as the soil is warm.

## **SWISS CHARD.**

Swiss Chard is a biennial that is mainly wind pollinated. It will cross pollinate with beets and spinach, so bagging will be necessary to save true-to-type seeds. Follow bagging instructions for BEET FAMILY. Seeds will remain viable for 10 years stored in a fridge.

## **SUNFLOWER**

Some varieties of Sunflowers are self-compatible while others are self-incompatible. Cross-pollination between varieties does occur causing a mingling of characteristics, but the seed is still viable. To save true-to-type seeds bagging and hand pollination works well for either variety. Using an old stocking or landscape cloth, cover at least two flower heads before the first florets open. Each day for ten days remove the bags, gently rub the surfaces of the two flower heads together, and rebag both heads. When the flower petals have fallen off, the heads can be cut and dried in an enclosed area away from direct sunlight and vermin. The seeds can be removed from the flower heads as soon as they are dried. Seeds which bend need further drying, Seeds that snap in two can be stored. Sunflower seeds remain viable for 7 years when stored in a fridge.



## **TARO**

Taro is propagated vegetatively in several ways. If only a few new plants are needed just the dark, top section of the root can be cut into individual pieces, and the rest harvested. In colder climates, the large corms (roots) should be dug up and stored whole and divided in the spring. In each case, leave the pieces aside for a few days to harden and then replant. Alternatively, the small corms that form on the sides of the main one can be replanted quite successfully.

**TARRAGON.** The French kind, not the Russian.

French Tarragon flowers are not fertile, so produce no seed. So this herb is propagated by root division. Dig up the whole plant in the spring, cut the root structure into individual pieces with a stem and lots of roots on each piece, and replant.

## **THYME**

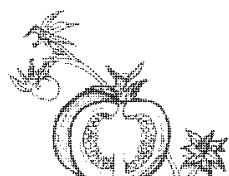
Insects will cross-pollinate Thyme with other varieties. Therefore, it is best propagated by digging up the plant, separate into separate plants with roots and replanting it into alkaline soil (or add lime to soil) in a very warm, well-drained spot.

**TOMATILLOS** Often called Cape Gooseberry.

Tomatillos are self-pollinating and do not commonly cross pollinate. Simply allow the fruits to ripen thoroughly on the vines. Remove the paper husks and scoop the seeds out of the fruit into a container of water. Leave for a few days to ferment in the warmth on the top of the fridge at the back. When there is a good white foam on top, pour it off and turn all the small, hard, yellow seeds at the bottom into a kitchen strainer and rinse clean. Turn the seeds out onto a cookie sheet to dry for a few days. Stored in a zip-lock bag in the fridge the seeds will remain viable for 5 years.

## **TOMATOES**

It is uncommon for modern tomatoes to cross-pollinate. Possible exceptions are 'currant' tomatoes (such as Texas Wild Tomato), 'potato-leaved' tomatoes (such as Brandywine), and fruit formed on double blossomed beefsteak types. Currant



and potato-leaf tomatoes will not cross pollinate with common tomato varieties. If fruits seem to be in good type-true shape, they should be safe for seed saving.

Allow tomatoes to ripen thoroughly on their vines. Cut the fruit across the middle and squeeze the seeds and surrounding gel into a disposable container. Add water to cover, stir and eat the rest of the tomato. Tomato seeds must be fermented in order to kill most seed-borne diseases and remove a germination-inhibiting gel which covers the seeds. Place the lidded container in a warm dark place for three days, while stirring twice each day. The mixture will start to cover with a layer of white or gray mold and smell terrible, but this is good, so long as you don't open it in the house. When the mold completely covers the surface, or bubbles can be seen rising in the mixture, add more water and stir vigorously. Ripe seeds will sink to the bottom, while bits of pulp and undeveloped seeds will float. Pour off the scum and rinse the seeds thoroughly. Repeat the process until only clean seeds remain at the bottom. Pour the seeds into a strainer and wipe the bottom on a towel to remove most of the moisture. Spread the seeds out in a single layer on a cookie sheet to finish drying away from direct sunlight. Stir each day to prevent clumping and promote even drying. Tomato seeds can maintain viability from 4-10 years stored in the freezer.

**TREE ONIONS.** Also called Walking Onion.

Tree onions produce a strong tall stem with several bulbets (little onions) at the top. They propagate themselves by bending their stalk to the ground allowing the little bulbets to plant themselves. They also over-winter in the garden, even in deeply frozen ground, just fine.

**TURNIP.** Also Swedes, Italian Turnip and Broccoli Raab.

Turnips are self-incompatible so several plants of the same variety growing together are needed to produce true-to-type seed. Although usually biennial, early varieties that are planted early in the season can produce viable seed in the same season. In milder regions they can be planted in the fall, winter over in the ground and then produce seed the following summer. In regions where the ground freezes they can be dug up and replanted into pots of soil and stored in a cool place indoors all winter. Stored in a root cellar they rot in 2-4 months. Follow bagging, hand pollinating and seed harvesting instructions for CABBAGE FAMILY.

**TURNIP-ROOTED CHERVIL**

Turnip-Rooted Chervil is a biennial that will reseed itself if left to over-winter in the garden under a hay or leaf mulch. It does not cross pollinate with salad chervil. Germination from saved seeds is difficult and seeds only remain viable for 6 months to a year. In *Seed to Seed* Suzanne Ashworth suggests hand harvesting mature seeds daily from the dry umbels before they shatter. Blow the chaff away and storing immediately in a cool place folded in a cloth between layers of sand in a box or jar, to sow the next spring.

**WATER CHESTNUTS**

Local Chinese produce stores are a good source of Water Chestnut corms. Plant them in old washtubs, tire ponds, or any other water garden in 3" – 4" (8-10cm) of compost and manure mixture under 2" – 6" (5-15cm) of water. The new corms form in the compost, to be harvested in the fall when the bright green leaves turn yellow. Store the corms in a sealed container in the fridge or buried in cool moist sand for replanting the following spring. The corms shrivel and deteriorate quickly at room temperature.

Water chestnuts are a delicious addition to stir fries or eaten raw. They have a crisp apple like texture even after cooking.

**WATERCRESS**

Watercress from the local grocery store will root and may be used as a source for plants. Divide the roots into smaller sections and replant them individually.

Alternatively, stand cuttings of stems in a jar of water until roots form, and then replant them into the garden or water garden.

The two species of watercress do not cross-pollinate with one another. In the heat of summer the plant will produce a mass of tiny white flowers which give way to fine red seeds in slightly curved pods. The seed pods shatter easily and are difficult to find so harvest daily as they dry. Rub the tiny dry pods between the hands or roll lightly with a rolling pin to extract the seeds. Stored in a dry, dark place the seeds will remain viable for 5 years.

### **WATERMELON**

Watermelons will cross pollinate with other varieties so bagging and hand-pollination is necessary to obtain true-to-type seeds. Even though watermelon flowers are small, this is relatively easy. In early maturing watermelons choose the very first female flowers for pollination. Late maturing varieties drop 90% of their first flowers so choose the second flush of flowers for hand-pollination. Follow directions listed for the Squash Family.

Watermelon seeds will remain viable for 6 years when stored in the fridge.

### **WATER SPINACH.**

Usually water spinach is propagated by cuttings. Asian shops are a good place to obtain original leaves or cuttings. Stand the stems in a jar of water until roots form, then transplant them into an outdoor water garden with a rich mud bottom. Make sure they have lots of room to send out their long runners, like sweet potatoes do. Water spinach also require lots of water in the summer when it produces a great quantity of greens.

The white or mauve morning glory type flowers will give way to seeds in pea-sized round shells that turn brown when ready to harvest. Dry the seeds to a crisp in about a day and then roll between 2 chopping boards or with a rolling pin to release the seeds. Stored in a sealed container in the fridge the seeds will remain viable for 3 years.

### **YARD LONG BEANS.** Also Snake Beans and Asparagus Beans.

These beans self-pollinate automatically, so simply leave the beans on the plant and harvest by hand as they shrivel and turn brown. They will need very little additional drying before storing for the winter. If rain threatens, so long as a goodly number of the seeds are fully mature, pull the whole plant out and hang to dry away from direct sunlight. Shell the seeds by hand and blow the chaff away with a hairdryer. Seeds will remain viable 3-8 years.

### **ZUCCHINI**

Zucchini information is the same as for the SQUASH FAMILY.