

# Germination Requirements of Seeds

## Bill Cullina

What is interesting and maybe a little intimidating about seed sowing are the different requirements that have to be met before a particular species will germinate. Most temperate plants have some mechanism that prevents their seeds from germinating during the wrong season, when they'd be killed by harsh weather. These mechanisms involve some combination of temperature fluctuation, the presence of moisture, light, or inhibitors in the fruit or husk and/or the need for mechanical scaring of the seed coat.

To make things simpler, we indicate on every seed packet what treatment that species will need for optimal germination. Again, this is meant as a guide, and following these recommendations will usually lead to the fastest and most consistent results. But if all the different treatments seem intimidating, simply sow the seeds outdoors in the spring or fall and let the seeds germinate when they are ready. These Codes are as follows:

**Germination Code A:** seed will germinate within 4 weeks if sown at 70 degrees F.

This is a common pattern with tropical and annual plants, and a few hardy perennials fall in to this category as well. Addition of water is the mechanism allows the seed to germinate, so this pattern is more common with dry land and desert plants that must be ready to grow when the rains come (technically this is referred to as non-deep physiological dormancy). In order for many A type seeds to germinate, they need a period of 1-3 months of dry storage (after ripening) prior to planting. Thus, seed collected in fall and sown immediately will germinate poorly, while seed that has been cleaned and stored dry (preferably at 40 degrees) for 3 months will come up well. Still others, like many in the Aster family, will germinate with an A treatment, but emergence is erratic and slow. Cold stratification (B) will lead to more uniform germination in this case, and for that reason, I treat most of the A type seeds I sow as B. Partly this is because the length of dry storage or after-ripening necessary to overcome dormancy can be much longer to complete than cold stratification (Asclepias seed may require a year of dry storage to germinate well, but only 60 days of moist, cold

stratification will yield the same percentages) A period of moist cold will generally have no ill effects, and it makes the process less complicated.

**Germination Code B:** seed will germinate upon shifting to 70 degrees after 90 days moist, cold stratification at 40 degrees

This is by far the most common germination pattern among the temperate wildflowers. It is vital that the seed be sown and well moistened before exposing it to cold. Water "activates" hormone and enzyme systems in the seed that block germination and allow the embryo to measure the length of cold that it is receiving. Dry, cold storage will not usually substitute for moist stratification if the seeds are truly type B germinators. The easiest way to germinate seeds of this type is to sow them outdoors in fall - either directly in the garden or in prepared bed or pots kept in a cold frame or crawl space that does not get too cold. Natural temperature changes are often much more effective than those you might achieve by placing the flats in a refrigerator. However, if you receive your seeds late in the winter, live in an area where winter temperatures do not stay regularly below 50 degrees, or do not have a place to keep them outdoors, you can sow them in pots and place them inside a plastic bag in the refrigerator (not freezer) section of your cooler. A method that takes even less space is to mix the seed with some damp vermiculite in a self-seal baggie and put them in the cooler that way. After cold treatment, sow the lot in a container just as you would any seed.

**Germination Code C:** seeds germinate only after multiple cycles of warm and cold, typically 40-70-40-70.

Multicycle germination is common in the Lily family and woodland forbs. It is a slow process that discourages many beginning propagators, but it is really not too difficult. Long germination times are necessary for several reasons. First, many plants, like Trillium, Polygonatum, and Dirca are two stage germinators - that is after their first cold period they germinate underground to form a rudimentary rhizome or bulb and root system, but must be exposed to another cycle of cold and warmth to send up the cotyledon, or in the case of Jeffersonia, the first true leaves. Secondly, some (Jeffersonia, Caulophyllum, some Quercus) are hypogeal germinators, with cotyledons that remain under ground to feed a developing root system the first year or two. Thirdly, plants like Goldenseal have embryos that are not fully developed when the seed is ripe, and need a full growing season to mature the embryo and prepare for germination. Others, like Blue Cohosh have extremely hard seed

coats that need time to weather away so that water can permeate. In all cases where the seed is both hydrophyllic (\*) and a C type germinator, germination may be enhanced by collecting the seed when it is immature and sowing it immediately outdoors. Roughly this means collecting the seed 3-4 weeks early, but you may have to experiment with a particular genus to get the timing right. Seed should be plump and full size, but still green or white without a hardened/darkened seed coat. I have had success with Actaea, Trillium, Clintonia, Hydrastis, and some Disporum using this method but it does not always work. Furthermore, most C germinators need exposure to the cycling or fluctuating temperatures and long warm and cold seasons (4-6 months) that you find outdoors, and germination under artificial conditions of refrigeration/greenhouse is hit or miss. Seed that is sown in beds or cold frames and kept watered and allowed to go through the natural seasons will give the best results.

**Germination Code D:** seed needs a period of warm moist stratification followed by cold stratification and will germinate after shifting back to warm (70-40-70).

This is a common cycle with early ripening, hydrophyllic species like Bloodroot that naturally experience this pattern when they fall to the ground in early summer. Since I sow most of the hydrophyllic species immediately outdoors, they get the proper treatment as a matter of course. However, when we sell seed of plants like Bloodroot that has been stored moist at 40 degrees since collection, it will not germinate until it receives 3-4 months of warm then 3-4 months cold temperatures, so typically will not emerge until the second spring if sown outdoors in February or March. Some hypogeal species, like many of the true lilies, form a bulb and roots at 70 then sent up a cotyledon after 3 months at 40. There are others, like Black Cohosh, that have immature embryos which require 3 months of moist warmth to develop before shifting to cold. Since both the Lilies and Cimicifugas ripen late in the year, I usually sow the seed in flats in a warm greenhouse (or on top of the refrigerator, near a radiator - any warm place) and leave them for at least three months before shifting them to a cold frame or the refrigerator for 3 months. In this way they come up well the following spring instead of waiting an additional year.

**Germination Code G:** Physical or Chemical inhibitors in the pulp and skin of fleshy fruits

Many if not most seeds that ripen in fleshy fruits must be well washed of all pulp to remove possible germination inhibiting chemicals it contains

and also to remove physical barriers to water absorption . See seed cleaning . *Hydrastis canadensis*

**Germination Code H:** Seed requires light to germinate

Small seeds that lack the resources to germinate deep underground are sensitive to light, and will germinate only when a certain minimum intensity of light hits the seed coat. This is a cue that they are positioned at or near the soil surface. As a rule of thumb, I treat any seed smaller than a grain of salt as a type H, because they need to be sown shallowly anyway, whether light is important or not. There are also a few large-seeded species that require light, but these are rare. The easiest way to handle H seeds outdoors is to sow them over the surface of a tamped and dampened seed mix and cover them with an 1/8<sup>th</sup> inch layer of washed, coarse quartz sand. Quartz sand transmits some light just as glass does, yet provides some protection from drying and weather. I use #1 filter washed filter sand, available at swimming pool supply stores, as it is uniform and coarse, but you can make your own by screening regular builders sand through a window screen than washing what remains in the screen to remove dust. It will have a few large pebbles that can be picked out, but is otherwise a good size - really a fine gravel. Alternatively, you can sow the seed on the surface of a moistened flat of seed mix and enclose the whole thing in a large, self-sealing bag. If the seed is type A,H, put the bag under grow lights at 70 degrees (you can put it on a windowsill, but it is hard to find a spot with enough sunlight light for most plants that will not at the same time heat up the bag too much). Seedlings can be left in the bag for up to a year, but check them regularly for water and fertilize every month with ½ strength liquid fertilizer when they are actively growing. Wean them out of this saturated environment slowly when they are large enough to transplant by first opening up the bag part way for a week or two. B,H seed can be treated the same except put the flats in the refrigerator for 3 months prior to setting them out in the light.

A final procedure that is an excellent way to start small-seeded, acid loving species like Galax, Shortia, and Epigaea and Gautheria is **moss-sowing**. If you have a damp spot in the yard where moss grows well and stays fairly damp through the growing season, you can shake the seeds into the moss carpet and carefully water them in. You may have to supplement watering to keep the moss damp, but this method can work remarkably well. Alternatively, you can establish a moss carpet in a container by transplanting some tufts of moss. The tight growing, carpeting types like fern-leaf moss are easiest to get going (a mix of 1:1 peat and sand is good for acid-loving mosses, but others grow well on

the surface of regular potting mixes as anyone who grows plants in containers can attest). Sphagnum works well, and certainly use it if you have some growing wild because it usually stays evenly moist. You can grow it by burying some of the long strands almost to their tips in a partially submerged container of 1:1 peat and sand, but it needs a season to become thick and established. All mosses are best watered with rain or distilled water. **Dryopteris goldiana**

**Germination Code I:** Seed requires scarification because of an impermeable seed coat.

Many plants in the bean and mallow family have hard seed coats that will not let water in to the embryo. Mechanical abrasion of the seed coat is necessary for imbibition and germination. Many legumes will germinate almost immediately after scarification but can take a year or more otherwise. There are several methods I have used. Placing a pile of seeds between two pieces of fine sandpaper and grinding the top piece back and forth quickly with your palm is easy and effective. It is not necessary to remove much of the coat, and typically 15 - 30 seconds of grinding is sufficient. Some people swear by the hot water method, where near boiling water is poured over a pot of seeds and they are allowed to cool and soak overnight before planting. The soaking allows the seed to imbibe all the water they need. I have had mixed results with this treatment. It works well with Baptisias and Prairie Clovers, but not so well with Lupines. The milkshake blender method of cleaning seeds I describe on page (???) also helps scarify them as well, and is an easy way to treat things like Blue Cohosh. Sowing the seed outdoors in fall will also weather the seed coat by spring, and for Baptisias, a combination of sandpaper scarification and cold stratification in a cold frame gives me consistent results.

**\*Hydrophilic Seed, intolerant of dry storage**

Includes all the ant-dispersed woodland species as well as a number of others that do not take desiccation very well. Freshly collected seed should be sown immediately or alternatively cleaned and stored in sealed plastic bags at 40 degrees. Seed that ripens in fleshy fruits or has an attached elaiosome is best stored with a handful of slightly damp vermiculite mixed in. This maintains a consistent saturated atmosphere for the seeds. Small seeds as well as seeds that ripen in dry capsules and lack elaiosomes can be stored with out the vermiculite, which will discourage molds.

## Native genera containing at least some hydrophyllic species

Aconitum	Cimicifuga	Epigaea
Actaea	Claytonia	Erythronium
Aesculus	Clintonia	Galax
Allium (some)	Coptis	Hepatica
Anemone	Corydalis	Hydrastis
Anemonella	Delphinium	Hydrophyllum
Asarum	Dentaria	Iris (woodland)
Calla	Dicentra	Isopyrum
Caltha	Diphylleia	Jeffersonia
Carex (some)	Diplazium	Lindera
Caulophyllum	Disporum	Lysichiton
Chamaelirium		Medeola
Chrysogonum		Melanthium
		Mertensia
		Mitchella
		Orontium
		Osmunda
		Pachysandra
		Panax
		Phlox (some)
		Podophyllum
		Polygala (some)
		Polygonatum
		Pyrola
		Pyxidanthera
		Quercus
		Rosa
		Sanguinaria
		Shortia
		Smilacina
		Stylophorum
		Trillium
		Trollius
		Uvularia
		Viola
		Xerophyllum

(portions excerpted from: The New England Wild Flower Society Guide to Growing and Propagating Wildflowers, and Native Trees, Shrubs, and Vines by William Cullina)

# Seed Propagation Workshop

## Bill Cullina

### Structure of Workshop

- Introduction
- Seed Collection lecture
- Seed Collection Demonstration
- Seed Sowing/Germination Lecture
- Seed Cleaning/Sowing Demonstration

### Introduction:

#### **Why grow plants from seed?**

- Straightforward – little equipment is needed.
- Genetic diversity lost on clones – gardener's natural selection
- Disease free. Viruses, mycoplasma-like organisms, foliar nematodes, systemic fungus and bacterial diseases rarely pass from parent to seed. Not true of vegetatively produced plants – even most tissue-culture procedures
- Provenance/genotype
- It's FUN!, and you'll have plenty of plants to share with friends. Trading plants has been the catalyst for some of my most lasting friendships.

### Seed Collection:

*A seed is a living organism, dependent on its stored energy reserves for survival until it begins to photosynthesize for itself. Once the seed is removed from the parent, it begins a race against death. It either germinates successfully and begins to photosynthesize on its own, or fails to germinate before it uses up its stored reserves and therefore dies. The more energy reserves the seed has and the slower it must use them, the better are the chances it will germinate and grow. This has ramifications for both seed collection and storage. So...*

- **Select healthy parents.** Plants growing under optimal conditions will have more surplus energy to allot to seed production. Plants stressed by drought, disease, etc. are not good candidates. Also, try to collect seed from several different plants. IF collecting seed from the wild, be sure to ask the landowner's permission first and please do not collect from rare or endangered populations.

- **Allow the seeds to become fully ripe before harvesting.** Ripening is a 2 part process of embryo development (maturation of the baby plant contained in the seed) and food accumulation (in most cases the accumulation of stored starches, fats, and proteins that nurture the seed while dormant and as it germinates), so a fully ripened seed with a mature embryo has the best chance of survival.
  - **How do I know the seed is ripe?** (not an existential question)
    - Seed coats usually turn from green, yellow or white to tan, brown or black when ripe. **Dicentra eximia, Aster macrophyllus**
    - The color of fruits pulpy is also a good guide. Fruit showing mature color (red, orange, blue, etc) indicates that the seed inside is ripe. Often, though, the seed coat itself will mature before the fruit that surrounds it, allowing you to collect before birds or rodents get all the berries. **Hydrastis canadensis**
    - Capsules will usually dry and crack or split as an indication of seed ripeness. **Penstemon serrulatus, Spigelia marilandica, Diplazium pycnocarpon**
    - If you are unsure, gather the seed in several batches over the course of 2-3 weeks to insure you have collected some ripe seed. **Viola labradorica**
    - You can slice open a seed with a sharp blade and look at the condition of the endosperm. Since the endosperm matures last, you can gauge the ripeness of seed by its characteristics. If the endosperm has completely filled the interior, and is about the color and consistency of ripe coconut, the seed should be sufficiently mature **Diphylleia cymosa**

#### **Garden vs. Wild Collected seed**

- Garden seed is more accessible, often better quality since it is growing under (hopefully) more ideal conditions.
  - Problems with hybridization compounded by self-incompatibility
  - Original wild provenance is often difficult to determine
- Wild seed is more likely true-to type, assuredly local genotype, however, it requires much more effort to get the seed on time, often have to travel quite a bit.
  - Never collect seed from rare or endangered species
  - Limit yourself to >5% of available seed, and collected a bit from many plants rather than all from one
  - Get landowner permission. Taking seed from someone else's land is a crime

#### **Seed Cleaning and Storage:**

- **Promptly clean and dry the seeds after harvest.** For conventional seed, drying slows down metabolism and triggers dormancy, which allows the seed to stay in a state of suspended animation indefinitely. Seeds that are contained in heads,

capsules, or pods can be air-dried in a paper bag or on newspaper until the stems or other fleshy parts are crisp. The seed can then be sifted, pulled, or screened, removing as much of the non-seed material as possible and put in a labeled and dated envelope. **Penstemon serrulatus, Potentilla tridentata, Dryopteris goldiana**

- **Seeds contained in fleshy fruits are best removed while the fruit is still moist.** Squeeze or pick the seeds from the fruit and wash them in a bowl or strainer to remove bits of pulp that are attached. This is important, as fruits often contain germination inhibitors that will delay or prevent germination if not removed. **Hydrastis canadensis.** Air-dry the cleaned seed for a day or two before packaging.
- **\*\*\*\*Exceptions to this are what I call hydrophyllic seeds** (see “Seeds with Special Needs” article). These are indicated on your Germination Methods handout with an asterisk. Hydrophyllic seeds should be cleaned and sown immediately. If they are allowed to dry out they will either die or be severely delayed in germinating. If you cannot sow them right away, store the cleaned seed refrigerated in a sealed ziplock type bag with or without dampened (but not wet!) vermiculite, which is sold at any garden center. **Trillium cuneatum**
- **Refrigerate your cleaned seed.** Low temperature slows down the seed’s metabolic processes, allowing for dramatic increases in storage life over seed stored at room temperature. (see “Storing Seeds” article)

## Seed Sowing

- **Containers and Soil**
  - **Use clean containers with drainage holes** - if you are reusing pots, first soak them in a 10 percent Clorox bleach solution ( 1 part bleach. 9 parts water) overnight. You can use anything from Styrofoam coffee cups or the bottoms of milk cartons to standard pots or seed flats, but remember that the size and the shape of the container affects the speed at which the soil dries, so for ease of watering it is best to standardize as much as possible. I would recommend about a four-inch square container for a packet of seeds. It is best to buy a commercial seed starting mix like Metromix 360 or Promix BX, (ask your local garden center for a brand they recommend) as these are pasteurized and pretty light and drain well.
  - **Avoid using garden soil or unpasteurized compost for seed sowing** as these often contain disease and contain fine particles which can “clog up” the mix. If your bag of potting mix is dry when opened, add some water to the bag and mix it around until it is consistently damp. Fill the pot up to the rim with your potting mix and use the bottom of another pot to tamp it down lightly so it is about half an inch below the rim.
- **Sowing the Seed.** A good rule of thumb is to plant seeds as deep as they are long, so an Aster seed, which is 1/4 inch long, would be planted 1/4 inch below

the surface. Be careful not to plant seeds too deep, as this is one of the main reasons for failure. Small seeds (smaller than a grain of salt) as a rule should not be covered, as they often need light hitting them for germination to take place (we'll cover this in more detail under germination requirements). To prevent them from washing away or drying out, they can be covered with a thin layer of coarse sand or fine gravel (just enough to hide the surface of the potting mix from view).

- Once the seeds are planted, water them gently but thoroughly being careful not to wash them out of the pot. We cover all the seeds we sow outdoors with a layer of sand, as this helps prevent them from washing out in rainstorms, but this does make it harder to tell when to water.

### **Aftercare**

Once you have watered the seeds and they begin to soak it up and swell, there is no turning back. If they dry out again at this point, they will probably die, so it is important to keep them evenly moist. As long as the soil surface is damp, they are OK. Once the seedlings are up, let the surface of the potting mix dry slightly in between waterings (it will turn the gray/brown color of old chocolate), as this discourages rots.

Fertilize germinated seedlings after they are 2-4 weeks old with a weak liquid fertilizer solution (use 1/4-1/2 the manufacturer's recommended rate). Only repot them when they have become crowded, and avoid doing any transplanting after Labor Day, as they will not have time to reestablish before winter.

**Germination codes –Alpha order**  
**William Cullina**

- Achlys triphylla (Vanilla Leaf) - B\*
- Aconitum reclinatum (Trailing Wolfsbane) - B\*
- Aconitum uncinatum (Wild Monkshood) - B\*
- Acorus calamus (Sweet Flag) - B
- Actaea pachypoda (Doll's Eyes) - B or C\*
- Actaea pachypoda v. rubrocarpa (Red Doll's Eyes) - B or C\*
- Actaea rubra (Red Baneberry) - B or C\*
- Actaea rubra forma leucocarpa (White-fr. Red Baneberry) - B or C\*
- Adiantum aleuticum 'Subpumulum' (Dwarf Maidenhair Fern) - A, H (MOSS)
- Adiantum pedatum (Northern Maidenhair Fern) - A, H (MOSS)
- Adiantum pedatum 'Billingsae' (Maidenhair Fern) - A, H (MOSS)
- Adiantum viridemontanum (Green Mountain Maidenhair) - A, H (MOSS)
- Adlumia fungosa (Climbing Fumitory) - A or B
- Aesculus pavia (Red Buckeye) - B\*
- Agastache foeniculum (Anise Hyssop) - A or B
- Agastache rupestris (Sunset Hyssop) - A or B
- Agastache scrophulariifolia (Purple Giant Hyssop) - A or B
- Aletris farinosa (Unicorn Root) - A, H
- Alisma subcordatum (Water Plantain) - B, H
- Allium cernuum (Nodding Onion) - B
- Allium stellatum (Prairie Onion) - B
- Allium tricoccum (Wild Leek) - C\*
- Amelanchier canadensis (Serviceberry) - B
- Amianthium muscivomicum (Fly poison) - B
- Amorpha canescens (Lead Plant) - B, I
- Amorpha fruticosa (False Indigo) - B, I
- Amorpha nana (Fragrant False Indigo) - B, I
- Amsonia ciliata (Blue Star) - B
- Amsonia ciliata var. filiformis (Narrow-leaf Bluestar) - B
- Amsonia hubrichtii (Arkansas Blue Star) - B
- Amsonia illustris (Blue Star) - B
- Amsonia rigida (Stiff Blue Star) - B
- Amsonia sp. (montana) - (Blue Star) - B
- Amsonia tabernae. (Dwarf form) - (Dwarf Blue Star) - B
- Amsonia tabernaemontana. var. salicifolia. (Willowleaf Blue Star) - B
- Amsonia tabernaemontana (Blue Star) - B
- Amsonia tabernaemontana v. alba (Blue Star) - B
- Andropogon gerardii (Big Blue Stem) - A or B
- Andropogon glomeratus (Broom Sedge) - A or B
- Anemone canadensis (Windflower) - B\*
- Anemone caroliniana (Prairie Anemone) - B\*
- Anemone cylindrica (Long-headed Anemone) - B
- Anemone multifida (Dark-fld.) - (Cut-leaved Anemone) - B
- Anemone (Pulsatilla) - patens ssp. multifida (Pasque Flower) - A\*
- Anemone quinquefolia (Windflower) - B\*
- Anemone riparia (Thimbleweed) - B
- Anemone virginiana (Thimbleweed) - B
- Anemonella thalictroides (Thalictrum thalictroides) - (Rue Anemone) - D\*
- Angelica atropurpurea (Great Angelica) - D
- Antennaria alpina (Pussy-toes) - B
- Antennaria microphylla (Pussytoes) - B
- Antennaria microphylla (rosea) - (Pussytoes) - B
- Antennaria parlinii ssp. fallax (Pussy-toes) - B
- Antennaria virginica (Pussy-toes) - B
- Aquilegia canadensis (Wild Columbine) - B
- Aquilegia coerulea (Rocky Mountain Columbine) - B
- Aquilegia formosa (Columbine) - B
- Arabis blepharophylla (Rock Cress) - A
- Aralia racemosa (Life-of-Man) - B
- Aralia spinosa (Hercules Club) - B
- Arctostaphylos uva-ursi (Bearberry) - B, G, I
- Arenaria stricta (Rock Sandwort) - A
- Arisaema dracontium (Green Dragon) - B
- Arisaema triphyllum. v. stewardsonii (Northern Jack-in-the-Pulpit) - B
- Arisaema triphyllum (Jack-in-the-Pulpit) - B
- Aruncus dioicus (Goatsbeard) - A or B, H
- Asarum canadense (Wild Ginger) - D\*
- Asarum caudatum (Western Ginger) - D\*
- Asarum lemmonii (Western Ginger) - D\*
- Asclepias hirtella (Green Milkweed) - B
- Asclepias incarnata (Swamp Milkweed) - B
- Asclepias purpurascens (Purple Milkweed) - B
- Asclepias speciosa (Showy Milkweed) - B
- Asclepias tuberosa (Butterfly Weed) - B
- Asclepias tuberosa 'Best Gold' (Butterfly Weed) - B
- Aspidotis densa (Cliff fern) - A, H (MOSS)
- Asplenium platyneuron (Ebony Spleenwort) - A, H (MOSS)
- Asplenium trichomanes (Maidenhair spleenwort) - A, H (MOSS)
- Asplenium trichomanes (Ebony Spleenwort) - A, H (MOSS)
- Asplenium x pinnatifidum (Lobed Spleenwort) - A, H (MOSS)
- Aster acuminatus (Whorled Aster) - A or B
- Aster azureus (Aster) - A or B
- Aster (Doellingeria) - umbellatus (Flat-topped Aster) - A or B
- Aster ericoides (Heath Aster) - A or B

Aster (Eurybia) - divaricatus (White Wood Aster) - A or B  
 Aster (Eurybia) - macrophyllus (Large-leaved Aster) - A or B  
 Aster lateriflorus v. horizontalis (Calico Aster) - A or B  
 Aster lineariifolius (Bristly Aster) - A or B  
 Aster macrophyllus (Large-leaved Aster) - A or B  
 Aster novae-belgii (New York Aster) - A or B  
 Aster patens (Spreading Aster) - A or B  
 Aster ptarmicoides (White Upland Aster) - A or B  
 Aster puniceus var. firmus (Purple-stemmed Aster) - A or B  
 Aster schreberi (Woodland Aster) - A or B  
 Aster spectabilis (Showy Aster) - A or B  
 Aster (Symph) - novae-angliae (New England Aster) - A or B  
 Aster (Symphyotrichum) - cordifolius (Blue Wood Aster) - A or B  
 Aster (Symphyotrichum) - ericoides 'Schneegitter' (Prostrate Heath Aster) - A or B  
 Aster (Symphyotrichum) - laevis (Smooth Aster) - A or B  
 Aster (Symphyotrichum) - oblongifolius (Aromatic Aster) - A or B  
 Aster (Symphyotrichum) - turbinellus (Prairie Aster) - A or B  
 Aster tenuifolius (Salt Marsh Aster) - A or B  
 Aster tradescantii (Aster) - A or B  
 Aster x herveyi (Aster) - A or B  
 Astilbe biternata (False Goatsbeard) - A,H  
 Astragalus crassicaulis (Ground Plum) - A,I  
 Astragalus plattensis (Ground Plum) - A,I  
 Athyrium filix-femina (Lady Fern) - A, H (MOSS)  
 Athyrium filix-femina v. rubellum (Red-stemmed Lady Fern) - A, H (MOSS)  
 Baccharis halimifolia - (Groundsel Tree) - B  
 Baptisia alba v. macrophylla (Prairie False Indigo) - B,I  
 Baptisia australis (Blue False Indigo) - B,I  
 Baptisia australis v. minor (Small False Indigo) - A or B,I  
 Baptisia bracteata v. leucophaea (False Indigo) - B,I  
 Baptisia pendula (alba) - (White False Indigo) - A,G  
 Baptisia tinctoria (Wild Indigo) - A or B,I  
 Baptisia tinctoria (False Indigo) - A,G  
 Besseyia bullii (Kitten Tail) - A  
 Blechnum spicant (Deer Fern) - A, H (MOSS)  
 Blephilia hirsuta (Hairy Wood Mint) - B  
 Boltonia aster. v. latisquama nana (Dwarf False Aster) - A or B  
 Boltonia asteroides (false Aster) - B  
 Boltonia asteroides 'Snowbank' (False Aster) - A or B  
 Boltonia decurrens (Decurrent False Aster) - B  
 Bouteloua curtipendula (Sideoats Gramma) - A,H  
 Boykinia aconitifolia (Brook Saxifrage) - A  
 Cacalia suaveolens Sweet-Indian Plantain B  
 Calla palustris (Water Arum) - B\*  
 Callirhoe digitata (Wine Cups) - B,I  
 Callirhoe involucrata (Wine Cups) - B,I  
 Callirhoe triangulata (Poppy Mallow) - B, I  
 Caltha palustris (Marsh Marigold) - B\*  
 Calycanthus floridus (Carolina Allspice) - B  
 Camassia cusickii (Camas Lily) - B  
 Camassia leichtlinii v. suksdorfii (Camas Lily) - B  
 Camassia quamash 'Blue Melody' (Camas Lily) - B  
 Camassia scilloides (Meadow Hyacinth) - B  
 Campanula divaricata (Southern Harebell) - A or B,H  
 Campanula rotundifolia (Harebell) - A or B,H  
 Campanulastrum americanum (Tall Bellflower) - B, H  
 Campsis radicans (Trumpet Vine) - B  
 Camptosorus rhizophyllus (Walking Fern) - A, H (MOSS)  
 Carex alopecoidea (Sedge) - B, H  
 Carex appalachica (Upland Sedge) - B  
 Carex grayii (Gray's Sedge) - B  
 Carex mertensii (Sedge) - B  
 Carex muskingumensis (Palm Sedge) - B,H  
 Carex pensylvanica (Pennsylvania Sedge) - B  
 Carex plantaginea (Plantain Sedge) - B\*  
 Carex platyphylla (Silver Sedge) - B\*  
 Carex sterilis (Sedge) - B,H  
 Carex stricta (Tussock Sedge) - B,H  
 Cassia (Senna) hebecarpa (Northern Wild Senna) - B,I  
 Castilleja coccinea (Indian Paintbrush) - B,H (needs host - difficult)  
 Caulophyllum thalictroides (Blue Cohosh) - C\*  
 Ceanothus americanus (New Jersey Tea) - B,I  
 Ceanothus ovatus (Wild Lilac) - B, I  
 Cephalanthus occidentalis (Buttonbush) - A or B,H  
 Cercis canadensis (Eastern Redbud) - B,I  
 Chamaelirium luteum (Devil's Bit) - B, H  
 Chasmanthium latifolium (Northern Sea Oats) - B  
 Cheilanthes argentea (Hairy Lip Fern) - A, H (MOSS)  
 Cheilanthes lanosa (Hairy Lip Fern) - A, H (MOSS)  
 Cheilanthes tomentosa (Woolly Lip Fern) - A, H (MOSS)  
 Chelone cuthbertii (Cuthbert's Turtlehead) - A or B,H  
 Chelone glabra (White Turtlehead) - A or B,H  
 Chelone lyonii (Pink Turtlehead) - A or B,H  
 Chimaphila umbellata (Pipsissewa) - (needs fungal host)  
 Chrysogonum virginianum. v. virginianum (Golden Star) - B\*  
 Chrysopsis mariana (Golden Aster) - A  
 Cimicifuga americana (American Bugbane) - D\*  
 Cimicifuga racemosa (Black Cohosh) - D\*  
 Cimicifuga rubifolia (Rattletop) - D\*  
 Claytonia virginica (Spring Beauty) - D\*  
 Clematis albicoma (Small Curly-heads) - D\*  
 Clematis crispa (Blue Jasmine) - D\*

- Clematis ochroleuca* (Curly-Heads) - D\*  
*Clematis viorna* (Leather flower) - D  
*Clematis virginiana* (Virgin's Bower) - B  
*Clethra acuminata* (Cinnamon Clethra) - A, H (MOSS)  
*Clethra alnifolia* (Summersweet) - A, H (MOSS)  
*Clintonia borealis* (Blue Bead Lily) - B\*  
*Clintonia umbellulata* (Speckled Wood Lily) - C\*  
*Clintonia uniflora* C\*  
*Collinsonia canadensis* (Wild Citronella) - B  
*Conradina verticillata* (Cumberland Rosemary) - B  
*Coptis laciniata* (Oregon Goldthread) - C\*  
*Coptis trifolia* ssp. *groenlandica* (Goldthread) - B\*  
*Corallorrhiza maculata* (Spotted Coral Root) - (needs fungal host)  
*Corema conradii* (Black Crowberry) - B  
*Coreopsis atkinsoniana* (Columbia Coreopsis) - A  
*Coreopsis auriculata* 'Nana' (Dwarf Tickseed) - B  
*Coreopsis integrefolia* (Chipola River Coreopsis) - A  
*Coreopsis lanceolata* (Lance-leaved Coreopsis) - B  
*Coreopsis major* var. *stellata* (Greater Coreopsis) - B  
*Coreopsis palmata* (Prairie Tickseed) - B  
*Coreopsis rosea* (Pink Tickseed) - B  
*Coreopsis tripteris* (Tall Coreopsis) - B  
*Coreopsis verticillata* (Threadleaf Coreopsis) - A  
*Cornus alternifolia* (Pagoda Dogwood) - D  
*Cornus canadensis* (Bunchberry) - B  
*Cornus florida* (Flowering Dogwood) - B  
*Cornus racemosa* (Gray Dogwood) - D  
*Corydalis sempervirens* (Rock Harlequin) - D\*  
*Crataegus jonesiae* (Hawthorn) - C, I  
*Cymophyllus fraseri* (Fraser's Sedge) - B\*  
*Cypripedium acaule* (Pink Ladyslipper) - (needs fungal host - difficult)  
*Cypripedium parviflorum* (Small Yellow Ladyslipper) - (needs fungal host - difficult)  
*Cypripedium pubescens* (Large Yellow Lady-slipper) - (needs fungal host - difficult)  
*Cypripedium reginae* (Showy Lady-slipper) - (needs fungal host - difficult)  
*Cystopteris bulbifera* (Bulblet Fern) - A, H (MOSS)  
*Cystopteris protrusa* (Lowland Brittle Fern) - A, H (MOSS)  
*Dalibarda repens* (Dewdrop) - B  
*Darmera peltata* (Umbrella Plant) - B, H  
*Decodon verticillatus* (Water Willow) - B, H  
*Delphinium carolinianum* (Wild Larkspur) - B\*  
*Delphinium exaltatum* (Wild Larkspur) - B\*  
*Delphinium occidentale* (Larkspur) - B  
*Dennstaedtia punctilobula* (Hayscented Fern) - A, H (MOSS)  
*Dentaria* (Cardamine) - *diphylla* (Toothwort) - D\*  
*Dentaria* (Cardamine) - *maxima* (Showy Toothwort) - D\*  
*Deparia acrostichoides* (Silvery Spleenwort) - A, H (MOSS)  
*Deschampsia flexuosa* (Tufted Hair Grass) - B  
*Desmodium canescens* (Hoary Tick Trefoil) - A, G  
*Dicentra canadensis* (Squirrel Corn) - D\*  
*Dicentra cucullaria* (Dutchman's Breeches) - D\*  
*Dicentra eximia* (Wild Bleeding Heart) - D\*  
*Dicentra formosa* ssp. *oregana* (Western Bleeding heart) - B\*  
*Diervilla lonicera* (Bush Honeysuckle) - A,H  
*Diervilla sessilifolia* (Southern Bush Honeysuckle) - A,H  
*Diphylleia cymosa* (Umbrella Leaf) - D\*  
*Diplazium pycnocarpon* (Glade Fern) A, H (MOSS)\*  
*Disporum* (*Prosartes*) - *hookeri* (Western Mandarin) - D\*  
*Disporum* (*Prosartes*) - *lanuginosum* (Yellow Mandarin) - D\*  
*Disporum* (*Prosartes*) - *maculatum* (Nodding Mandarin) - C\*  
*Disporum smithii* (Western Mandarin) - D\*  
*Dodecatheon amethystinum* (Shooting Star) - B  
*Dodecatheon jeffreyi* (Shooting Star) - B  
*Dodecatheon meadia* (Shooting Star) - B  
*Dodecatheon pulchellum* (Shooting Star) - B  
*Draba arabisans* (*Draba*) - A,H  
*Draba ramosissima* (*Draba*) - A,H  
*Draba streptocarpa* (*Draba*) - A,H  
*Drosera anglica* (Sundew) - A, H (MOSS)  
*Drosera filiformis* (Dew Thread) - B,H  
*Drosera rotundifolia* (Round-leaved Sundew) - A, H (MOSS)  
*Dryas octopetala* (Mountain Avens) - B\*  
*Dryopteris campyloptera* (Mountain Wood Fern) - A, H (MOSS)  
*Dryopteris carthusiana* (*spinulosa*) - (Toothed Wood Fern) - A, H (MOSS)  
*Dryopteris celsa* (Log Fern) - A, H (MOSS)  
*Dryopteris clintoniana* (Clinton's Wood Fern) - A, H (MOSS)  
*Dryopteris cristata* (Crested Wood Fern) - A, H (MOSS)  
*Dryopteris cristata* v. *clintoni* (Clinton's Fern) - A, H (MOSS)  
*Dryopteris expansa* (Spreading Wood Fern) - A, H (MOSS)  
*Dryopteris filix-mas* (Male Fern) - A, H (MOSS)  
*Dryopteris goldiana* (Goldie's Fern) - A, H (MOSS)  
*Dryopteris intermedia* (Wood Fern) - A, H (MOSS)  
*Dryopteris marginalis* (Marginal Shield Fern) - A, H (MOSS)  
*Dryopteris x australis* (Dixie Wood Fern) - sterile  
*Echinacea angustifolia* (Small Coneflower) - B  
*Echinacea pallida* (Narrow Coneflower) - B  
*Echinacea paradoxa* (Yellow Purple Coneflower) - B  
*Echinacea purpurea* (Purple Coneflower) - B  
*Echinacea tennesseensis* (Tennessee Coneflower) - B  
*Echinocystis lobata* (Balsam Apple) - B  
*Empetrum nigrum* (Black Crowberry) - A,H

*Enemion biternatum* (Isopyrum) - (False Rue Anemone) - B\*  
*Epigaea repens* (Trailing Arbutus) - A, H (moss)  
*Epilobium angustifolium* (Fireweed) - B, H  
*Bragrostis spectabilis* (Purple Love Grass) - A or B  
*Erigeron allenii* (Fleabane) - A  
*Erigeron compositus* (Fleabane) - A  
*Erigeron flettii* (Fleabane) - A  
*Erigeron glabellus* (Fleabane) - A  
*Erigeron oreganus* (Fleabane) - A  
*Erigeron pulchellus* (Robin's Plantain) - A  
*Erigeron tweedyi* (Fleabane) - A  
*Eriophyllum lanatum* (Oregon Sunshine) - A  
*Eryngium yuccifolium* (Rattlesnake Master) - B  
*Erysimum torulosum* (Treacle Mustard) - A  
*Erythronium albidum* (White Trout Lily) - C\*  
*Erythronium americanum* (Trout Lily) - C\*  
*Euonymus americanus* (Wahoo) - B, G  
*Eupatorium album* (White Boneset) - A  
*Eupatorium coelestinum* (Mist Flower, Hardy Ageratum) - A  
*Eupatorium dubium* (Eastern Joe-Pye Weed) - A  
*Eupatorium fistulosum* (Joe-Pye Weed) - B  
*Eupatorium hyssopifolium* (Hyssop-leaved Boneset) - A  
*Eupatorium maculatum* (Joe-Pye Weed) - B  
*Eupatorium perfoliatum* (Common Boneset) - B  
*Eupatorium rotundifolium* (Round-leaved Boneset) - A  
*Eupatorium rugosum* (White Snakeroot) - A  
*Euphorbia corollata* (Flowering Spurge) - B  
*Fagus grandifolia* (Beech) - B (many seeds not viable)  
*Filipendula rubra* (Queen-of-the-Prairie) - B  
*Fothergilla gardenii* (Dwarf Fothergilla) - D\*  
*Fothergilla major* (Large Fothergilla) - D\*  
*Franklinia alatamaha* (Franklinia) - B  
*Gaillardia aristata* (Blanket Flower) - A  
*Galax urceolata* (Galax) - A, H (MOSS)\*  
*Gaultheria hispidula* (Creeping Snowberry) - B, H  
*Gaultheria procumbens* (Wintergreen) - B, G  
*Gaylussacia brachycera* (Box Huckleberry) - B, H  
*Gentiana alba* (flavida) - (Cream Gentian) - B, H  
*Gentiana andrewsii* (Closed Gentian) - B, H  
*Gentiana clausa* (Closed Gentian) - B, H  
*Gentiana saponaria* (Soapwort Gentian) - B, H  
*Gentianella quinquefolia* (Stiff Gentian) - B, H  
*Gentianopsis crinita* (Fringed Gentian) - B, H  
*Geranium maculatum* (Wild Geranium) - B\*  
*Geum macrophyllum* (Yellow avens) - A or B  
*Geum radiatum* (Avens) - A or B  
*Geum rivale* (Purple Avens) - A or B  
*Geum triflorum* (Prairie Smoke) - A or B  
*Gnaphalium pupureum* (Purple Cudweed) - A  
*Gymnocarpium dryopteris* (Oak Fern) - A, H (MOSS)  
*Halesia monticola* (Mountain Silver-bell) - D  
*Halesia tetraptera* (carolina) - (Silver-bell) - D  
*Hamamelis virginiana* (Common Witchhazel) - B or D\*  
*Helenium autumnale* (Sneezeweed) - A  
*Helenium flexuosum* (nudiflorum) - (Purple-headed Sneezeweed) - A  
*Helianthus decapetalus* (Thin-leaved Sunflower) - B  
*Helianthus giganteus* (Swamp Sunflower) - B  
*Helianthus maximilliani* (Maximillian's Sunflower) - B  
*Helianthus mollis* (Downy Sunflower) - B  
*Helianthus occidentalis* (Sunflower) - B  
*Helianthus salicifolius* (Willow-leaf Sunflower) - B  
*Helianthus tomentosus* (Downy Sunflower) - B  
*Heliopsis helianthoides* (Oxeye Sunflower) - A  
*Helonias bullata* (Swamp Pink) - A, H (MOSS)\*  
*Hepatica acutiloba* (Hepatica) - D\*  
*Hepatica americana* (Hepatica) - D\*  
*Heuchera alba* (Alumroot) - B, H  
*Heuchera americana* (Alumroot) - A or B, H  
*Heuchera cylindrica* (Alumroot) - A, H  
*Heuchera hispida* (Alumroot) - A, H  
*Heuchera micrantha* (Curly Alumroot) - A, H  
*Heuchera pubescens* (Alumroot) - A, H  
*Heuchera villosa* (Alumroot) - A or B, H  
*Hibiscus lasiocarpus* (Downy Rose Mallow) - B, I  
*Hibiscus militaris* (laevis) - (Marsh Mallow) - B, I  
*Hibiscus moscheutos* (palustris) - (Marsh Mallow) - B, I  
*Holodiscus discolor* (Creambush) - B  
*Houstonia caerulea* (Bluets, Quaker Ladies) - A, H  
*Hudsonia tomentosa* (Beach Heather) - A, I  
*Hydrangea arborescens* (Wild Hydrangea) - A, H  
*Hydrangea arborescens ssp radiata* (Velvet-leaf Hydrangea) - A, H  
*Hydrangea quercifolia* (Oak-leaved Hydrangea) - A, H  
*Hydrastis canadensis* (Goldenseal) - B and C\*  
*Hydrophyllum canadense* (Waterleaf) - B\*  
*Hydrophyllum virginianum* (Virginia Waterleaf) - B\*  
*Hypericum adpressum* (Creeping St John's-wort) - A  
*Hypericum buckleyi* (Blue Ridge St John's-wort) - A  
*Hypericum frondosum* (Golden St. John's-wort) - A  
*Hypericum frondosum 'Sunburst'* (Golden St. John's-wort) - A  
*Hypericum kalmianum* (St John's-wort) - A  
*Hypericum mitchellianum* (Blue Ridge St-John's-wort) - A  
*Hypericum prolificum* (Shrubby St-John's-wort) - A  
*Hypericum pyramidatum* (St-John's-wort) - A  
*Hypoxis hirsuta* (Star Grass) - B  
*Hystrix patula* (Bottle-brush Grass) - A  
*Ilex glabra* (Inkberry Holly) - C, G  
*Ilex laevigata* (Smooth Winterberry) - B, G  
*Ilex opaca* (American Holly) - C, G  
*Ilex verticillata* (Winterberry Holly) - C, G  
*Impatiens pallida* (Pale Jewelweed) - B  
*Ipomoea leptophylla* (Bush Morning Glory) - A, I

*Iris brevicaulis* (Lamance Iris) - B  
*Iris cristata* (Dwarf Crested Iris) - B\*  
*Iris douglasiana* (Pacific Iris) - B  
*Iris missouriensis* (Blue Flag) - B  
*Iris prismatica* (Cube Iris) - B  
*Iris tenax* (Oregon Iris) - B  
*Iris verna* v. *smalliana* (Clumping Dwarf Iris) - B\*  
*Iris versicolor* (Blue Flag Iris) - B  
*Iris virginica* (Southern Blue Flag) - B  
*Iris virginica* var. *shrevei* (Southern Blue Flag) - B  
*Isopyrum* (*Enemion*) - *biternatum* (False Rue Anemone) - D\*  
*Jeffersonia diphylla* (Twinleaf) - D\*  
*Juncus torreyi* (Torrey's Rush) - B,H  
*Kalmia angustifolia* (Sheep Laurel) - A, H (MOSS)  
*Kalmia latifolia* (Mountain Laurel) - A, H (MOSS)  
*Ledum* (*Rhododendron*) *groenlandicum* (Labrador Tea) - A, H (MOSS)  
*Leiophyllum buxifolium* (Sand Myrtle) - A, H (MOSS)  
*Leiophyllum buxifolium* (*prostratum*) - (Sand Myrtle) - A, H (MOSS)  
*Lesquerella douglasii* (Columbia Bladderpod) - A  
*Leucothoe fontanesiana* (*catesbaei*) - (Dog Hobble) - A, H (MOSS)  
*Leucothoe racemosa* (Sweetbells) - A, H (MOSS)  
*Lewisia columbiana* (*Lewisia*) - B  
*Lewisia cotyledon* (*Lewisia*) - B  
*Lewisia nevadensis* (*Lewisia*) - B  
*Liatris aspera* (Rough Blazing-star) - B  
*Liatris borealis* (Northern Blazing-star) - B  
*Liatris borealis* f. *albiflora* (White Northern Blazing-Star) - B  
*Liatris cylindracea* (Slender Blazing-Star) - B  
*Liatris graminifolia* (Blazing Star) - B  
*Liatris ligulistylis* (Meadow Blazing Star) - B  
*Liatris microcephala* (Small-headed Blazing Star) - B  
*Liatris microcephala* *hybrid* (Small-headed Blazing Star) - B  
*Liatris punctata* (Dwarf Blazing-star) - B  
*Liatris pycnostachya* (Prairie Blazing Star) - B  
*Liatris scar.* v. *novae-angliae* (New England Blazing Star) - B  
*Liatris spicata* (Marsh Blazing Star) - B  
*Liatris squarrosa* (Blazing-star) - B  
*Liatris squarrosa* var. *earlei* (Late Blazing Star) - B  
*Lilium canadense* (Canada Lily) - D  
*Lilium grayi* (Gray's Lily) - D  
*Lilium michiganense* (Michigan Turk's Cap Lily) - D  
*Lilium philadelphicum* (Wood Lily) - A  
*Lilium superbum* (Turk's-cap Lily) - D  
*Limonium nashii* (Sea Lavender) - A  
*Lindera benzoin* (Spicebush) - B or C\*  
*Linum perenne* ssp. *lewisii* (Prairie Flax) - A  
*Lobelia cardinalis* (Cardinal Flower) - A or B,H  
*Lobelia siphilitica* (Great Lobelia) - A or B, H  
*Lobelia spicata* (Pale-Spike) - A  
*Lonicera sempervirens* (Trumpet Honeysuckle) - B  
*Lupinus perennis* (Sundial Lupine) - A,I  
*Lychnis alpina* (Alpine Campion) - A  
*Lycopodium tristachyum* (Princess Pine) - needs fungal host  
*Lygodium palmatum* (Hartford Fern) - B,H  
*Lyonia mariana* (Staggerbush) - B, H (MOSS)  
*Lysichiton americanum* (Western Skunk Cabbage) - A\*  
*Magnolia acuminata* (Cucumbertree Magnolia) - B  
*Magnolia ashei* (Ashe's Bigleaf Magnolia) - B  
*Magnolia tripetala* (Umbrella Magnolia) - B  
*Magnolia virginiana* (Sweetbay Magnolia) - B  
*Maianthemum canadense* (Canada Mayflower) - B or C\*  
*Maianthemum camtschaticum* (Western Mayflower) - B\*  
*Maianthemum* (*Smilacina*) *racemosum* (False Solomon's Seal) - C\*  
*Maianthemum* (*Smilacina*) - *stellatum* (Star Flower) - B\*  
*Manfreda virginica* v. *tigrina* Eastern Agave B  
*Matteuccia struthiopteris* (*penns.*) - (Ostrich Fern) - A, H (MOSS)\*  
*Medeola virginiana* (Indian Cucumber) - C\*  
*Melanthium hybridum* (Broad-leafed Bunchflower) - B\*  
*Melanthium virginicum* (Broad-leafed Bunchflower) - B\*  
*Mertensia virginica* (Virginia Bluebells) - B\*  
*Mimulus cardinalis* (Scarlet Monkey Flower) - A,H  
*Mimulus guttatus* (Common Monkeyflower) - A,H  
*Mimulus moschatus* (Muskflower) - A,H  
*Mimulus ringens* (Allegheny Monkey Flower) - A,H  
*Mitchella repens* (Partridge Berry) - B,G,H  
*Mitella diphylla* (Bishop's Cap) - A,H  
*Monarda bradburiana* (Bradbury's Bee Balm) - B  
*Monarda citriodora* (ANNUAL Lemon Mint) - B  
*Monarda clinopodia* (Basil Balm) - B  
*Monarda didyma* (Bee Balm) - B  
*Monarda fistulosa* (Wild Bergamot, Bee Balm) - B  
*Monarda meadia* (Wild Bergamot) - B  
*Monarda punctata* (Spotted Horsemint) - A  
*Monarda russeliana* (*Monarda*) - A  
*Myrica pensylvanica* (*Morella carolinensis*) - (Bayberry) - B, G,I  
*Napaea dioica* (Glade Mallow) - B  
*Nemopanthus mucronatus* (Mountain Holly) - C  
*Nothochelone nemorosa* (Turtlehead Beard-tongue) - B  
*Nothoscordum bivalve* (False Garlic) - B  
*Oenothera fruticosa* (Sundrops) - B  
*Oenothera macrocarpa* (*missouriensis*) - (Evening Primrose) - B  
*Oplopanax horridus* (Devil's Club) - D\*  
*Opuntia humifusa* (Prickly-Pear Cactus) - B or C, G, I

- Opuntia macrorhiza* (Prickly-Pear Cactus) - B B or C, G, I  
*Orontium aquaticum* (Golden Club) - A\*  
*Osmorhiza claytonii* (Woolly Sweet Cicely) - B  
*Osmunda cinnamomea* (Cinnamon Fern) - A, H (MOSS)\*  
*Osmunda claytoniana* (Interrupted Fern) - A, H (MOSS)\*  
*Osmunda regalis* (Royal Fern) - A, H (MOSS)\*  
*Oxydendrum arboreum* (Sourwood) - A, H (MOSS)  
*Pachysandra procumbens* (Allegheny Spurge) - D\*  
*Panax quinquefolius* (American Ginseng) - D\*  
*Panicum virginicum* (Switch Grass) - A, H  
*Parnassia grandiflora* (Grass of Parnassus) - B, H  
*Parthenium integrifolium* (Wild Quinine) - B  
*Parthenocissus quinquefolia* (Virginia Creeper) - B, G  
*Pedicularis canadensis* (Wood Betony) - B (needs host)  
*Pedicularis lanceolata* (Marsh Betony) - B (needs host)  
*Pellaea atropurpurea* (Purple Cliff Brake) - A, H (MOSS)  
*Penstemon australis* (Beard-tongue) - B  
*Penstemon davidsonii* (Beard-tongue) - B  
*Penstemon digitalis* (Smooth White Beard-tongue) - B  
*Penstemon dissectus* (Georgia Beard-tongue) - B  
*Penstemon grandiflorus* (Large-fl. Beard-tongue) - B  
*Penstemon hirsutus* (Hairy Beard-tongue) - B  
*Penstemon ovatus* (Beard-tongue) - B  
*Penstemon pinifolius* (Pine-leaf Beard-tongue) - B  
*Penstemon serrulatus* (Sky Pilot Beard-tongue) - B  
*Penstemon smallii* (Beard-tongue) - B  
*Penstemon whippleanus* (Beard-tongue) - B  
*Petalostemon candidum* (Wht. Prairie Clover) - A, I  
*Petalostemon purpureum* (Wht. Prairie Clover) - A, I  
*Petalostemon purpureum* (Purple Prairie Clover) - A, I  
*Phegopteris hexagonoptera* (Broad Beech Fern) - A, H (MOSS)  
*Phlox bifida* (Cleft Phlox) - B  
*Phlox divaricata* (Wild Blue Phlox) - B\*  
*Phlox maculata* (Wild Sweet William) - B  
*Phlox paniculata* (Border Phlox) - B  
*Phlox pilosa* var. *ozarkana* (Ozark Phlox) - B  
*Phlox stolonifera* (Creeping Phlox) - B  
*Phlox stolonifera* 'Pink Ridge' (Creeping Phlox) - B  
*Phyllitis scolopendrium* (Hart's Tongue Fern) - A, H (MOSS)  
*Physocarpus opulifolius* (Ninebark) - A  
*Physostegia virginiana* (False Dragonhead) - A  
*Pieris floribunda* (Fetter Bush) - A, G  
*Pityopsis falcata* (Sickle-leaved Golden Aster) - B  
*Pluchea purpurascens* (Marsh Fleabane) - B  
*Podophyllum peltatum* (Mayapple) - B\*  
*Pogonia ophioglossoides* (Rose Pogonia) - (needs fungal host)  
*Polemonium carneum* (Yellow Jacob's Ladder) - A, H  
*Polemonium foliosissimum* (Jacob's Ladder) - A, H  
*Polemonium pulcherrimum* (Jacob's Ladder) - A, H  
*Polemonium reptans* (Jacob's Ladder) - B  
*Polemonium reptans* var. *villosum* (Jacob's Ladder) - B  
*Polygala paucifolia* (Gaywings) - D\*  
*Polygonatum biflorum* v. *commutatum* (Giant Solomon's Seal) - C\*  
*Polygonatum pubescens* (Hairy Solomon's Seal) - C\*  
*Polygonella articulata* (Joint Stem) - A  
*Polymnia uvedalia* (Yellow-flowered Leaf-cup) - A  
*Polypodium virginianum* (Rock Polypody) - A, H (MOSS) (much spore sterile)  
*Polystichum acrostichoides* (Christmas Fern) - A, H (MOSS)  
*Polystichum braunii* (Braun's Holly Fern) - A, H (MOSS)  
*Polystichum lonchitis* (Northern Holly Fern) - A, H (MOSS)  
*Polystichum munitum* (Giant Holly Fern) - A, H (MOSS)  
*Porteranthus stipulatus* (American Ipecac) - B  
*Porteranthus trifoliatus* (Bowman's Root) - B  
*Potentilla arguta* (Tall Cinquefoil) - A  
*Potentilla fruticosa* (Shrubby Cinquefoil) - A  
*Potentilla glandulosa* (Cinquefoil) - A  
*Potentilla gracilis* A, B  
*Potentilla palustris* (Marsh Cinquefoil) - A  
*Potentilla pectinata* (Cinquefoil) - A  
*Potentilla rupestris* (Rock Cinquefoil) - A  
*Potentilla rupestris* v. *pygmaea* (Rock Cinquefoil) - A  
*Potentilla thurberi* (Southwestern Cinquefoil) - A  
*Potentilla tridentata* (Three-toothed Cinquefoil) - A or B  
*Prenanthes aspera* (Rattlesnake-root) - A  
*Pycnanthemum muticum* (Showy Mountain Mint) - B  
*Pycnanthemum pilosum* (Mt. Mint) - B  
*Pycnanthemum tenuifolium* (Willow Mt. Mint) - B  
*Pycnanthemum virginianum* (Mt. Mint) - B  
*Pyrola elliptica* (Shin-leaf) - (needs fungal host)  
*Pyxidantha barbulata* (Pixie Moss) - A, H (MOSS) (very difficult, may need fungal host)  
*Quercus ilicifolia* (Scrub Oak) - B\*  
*Ranunculus rhomboideus* (Prairie Buttercup) - A  
*Ratibida columnifera* (Mexican Hat) - A or B  
*Ratibida pinnata* (Prairie Coneflower) - A or B  
*Rhexia virginica* (Meadow Beauty) - B, H  
*Rhododendron arborescens* (Smooth Azalea) - A, H (MOSS)  
*Rhododendron calendulaceum* (Flame Azalea) - A, H (MOSS)  
*Rhododendron canadense* (Rhodora) - A, H (MOSS)  
*Rhododendron carolinianum* (Carolina Rhododendron) - A, H (MOSS)  
*Rhododendron catawbiense* (Catawba Rhododendron) - A, H (MOSS)  
*Rhododendron cumberlandense* (*bakeri*) - (Cumberland Azalea) - A, H

*Rhododendron maximum* (Great Laurel) - A, H (MOSS)  
*Rhododendron minus* (Piedmont Rhododendron) - A, H (MOSS)  
*Rhododendron prinophyllum* (Rose-shell Azalea) - A, H (MOSS)  
*Rhododendron prunifolium* (Plumleaf Azalea) - A, H (MOSS)  
*Rhododendron vaseyi* (Pink-shell Azalea) - A, H (MOSS)  
*Rhododendron viscosum* (Swamp Azalea) - A, H (MOSS)  
*Rosa arkansana* (Arkansas Rose) - B, I  
*Rosa carolina* (Carolina Rose) - B, I  
*Rosa palustris* (Swamp Rose) - B, I  
*Rosa setigera* (Prairie Climbing Rose) - B, I  
*Rosa virginiana* (Virginia Rose) - B, I  
*Rubus odoratus* (Purple Flowering Raspberry) - B  
*Rudbeckia fulgida* v. *speciosa* (Black-eyed Susan) - B  
*Rudbeckia fulgida* v. *sullivantii* (Black-eyed Susan) - B  
*Rudbeckia fulgida* var. *fulgida* (Black-eyed Susan) - B  
*Rudbeckia laciniata* (Tall Coneflower) - B  
*Rudbeckia laciniata* 'Herbstsonne' (Green-eye Coneflower) - B  
*Rudbeckia maxima* (Cabbage-leaf Coneflower) - B  
*Rudbeckia subtomentosa* (Sweet Coneflower) - A or B  
*Rudbeckia triloba* (Thin-leaved Coneflower) - B  
*Ruellia humilis* (Wild Petunia) - A or B  
*Ruellia pedunculata* (Wild Petunia) - A  
*Ruellia strepens* (Wild Petunia) - A  
*Sabatia kennedyana* (Plymouth Gentian) - B, H  
*Sagittaria latifolia* (Wapato, Arrowhead) - A, H  
*Salvia azurea* v. *grandiflora* (Prairie Sage) - A or B  
*Salvia* (Fiddle-leaf Sage) - A  
*Sambucus canadensis* (Elderberry) - A or B  
*Sambucus racemosa* (Red Elderberry) - A or B  
*Sanguinaria canadensis* (Bloodroot) - D\*  
*Sanguisorba canadensis* (Canadian Burnet) - B  
*Sarracenia flava* (Yellow Pitcher Plant) - B, H  
*Sarracenia (flava X purpurea)* - (Hybrid Pitcher Plant) - B, H  
*Sarracenia purpurea* (Northern Pitcher Plant) - B, H  
*Sarracenia rubra* (Sweet Pitcher Plant) - B, H  
*Sarracenia rubra* ssp. *jonesii* (Mountain Pitcher Plant) - B, H  
*Saxifraga careyana* (Carey's Saxifrage) - A, H  
*Saxifraga michauxii* (Michaux Saxifrage) - A, H  
*Saxifraga pensylvanica* (Swamp Saxifrage) - B, H  
*Schizachyrium scoparium*, var. *scoparium* (Little Bluestem) - A  
*Schizachyrium scoparium* (Little Bluestem) - A, H  
*Scirpus cyperinus* (Wool Rush) - B, H\*  
*Scirpus longii* (Sedge) - A\*  
*Scrophularia lanceolata* (Figwort) - A\*  
*Scutellaria incana* (Downy Skullcap) - B  
*Scutellaria integrifolia* (Hyssop Skullcap) - A  
*Scutellaria marylandica* (Skullcap) - B  
*Scutellaria ovata* (Early Blue Skullcap) - B  
*Scutellaria serrata* (Skullcap) - B  
*Sedum nevii* (Stonecrop) - A, H  
*Sedum pulchellum* - A, H  
*Sedum ternatum* (Stonecrop) - A, H  
*Senecio antennariifolius* (Groundsel) - A  
*Senecio obovatus* (Round-leaved Ragwort) - A  
*Senecio pauperculus* v. *praecox* (Balsam Groundsel) - B  
*Senna hebecarpa* (Wild Senna) - B, I  
*Senna marilandica* (Maryland Senna) - B, I  
*Shortia galacifolia* (Oconee Bells) - A, H (MOSS) (difficult)  
*Silene caroliniana*, ssp. *pensylvanica* (Wild Pink) - B  
*Silene caroliniana* ssp. *wherryi* (Wild Pink) - B  
*Silene regia* (Regal Campion) - B  
*Silene stellata* (Starry Campion) - B  
*Silene virginica* (Fiery Campion) - B  
*Silphium dentatum* (Rosinweed) - B  
*Silphium integrifolium* (Rosinweed) - B  
*Silphium laciniatum* (Compass Plant) - B  
*Silphium perfoliatum* (Cup Plant) - B  
*Silphium terebinthinaceum* (Prairie Dock) - B  
*Silphium trifoliatum* (Whorled Rosinweed) - B  
*Sisyrinchium angustifolium* (Blue-eyed Grass) - B  
*Sisyrinchium arnicola* (Sandplain Blue-eyed Grass) - B  
*Sisyrinchium campestre* (Blue-Eyed Grass) - B or C  
*Sisyrinchium elmeri* (Yellow-Eyed Grass) - A  
*Sisyrinchium fuscum* (arnicola) - (Blue-eyed Grass) - B  
*Sisyrinchium idahoense* (Big Blue-Eyed Grass) - B  
*Sisyrinchium mucronatum* (Blue-eyed Grass) - B  
*Solidago caesia* (Wreath Goldenrod) - A or B  
*Solidago cutleri* (Alpine Goldenrod) - A  
*Solidago flexicaulis* (Zigzag Goldenrod) - A or B  
*Solidago glomerata* (Goldenrod) - A or B  
*Solidago macrophylla* (Large-leaved Goldenrod) - A or B  
*Solidago multiradiata* (Goldenrod) - A or B  
*Solidago nemoralis* (Gray Goldenrod) - A or B  
*Solidago odora* (Sweet Goldenrod) - A or B  
*Solidago ohioensis* (Ohio Goldenrod) - A or B  
*Solidago (Oligoneuron) - rigida* (Stiff Goldenrod) - A or B  
*Solidago pinetorum* (Goldenrod) - A or B  
*Solidago puberula* (Downy Goldenrod) - A or B  
*Solidago riddellii* (Riddell's Goldenrod) - A or B  
*Solidago rugosa* (Roughstem Goldenrod) - A or B  
*Solidago sempervirens* (Seaside Goldenrod) - A or B  
*Solidago speciosa* (Showy Goldenrod) - A or B  
*Sorbus americanus* (American Mountain Ash) - B, G  
*Sorghastrum nutans* (Indian Grass) - A  
*Sparganium androcladum* (Bur Reed) - B  
*Sphaeralcea grossulariaefolia* (Globe Mallow) - B

*Spigelia marilandica* (Indian Pink) - B\*  
*Spiraea tomentosa* (Steeplebush) - B,H  
*Spiranthes odora*. (Large Ladies Tresses) - B,H (may need fungal host)  
*Sporobolus heterolepis* (Prairie Dropseed) - B  
*Staphylea trifolia* (Bladdernut) - D  
*Stenanthium gramineum*. v. *robustum* (Feather-fleece) - D  
*Stokesia laevis* (Stokes' Aster) - A  
*Streptopus roseus* (Rosy Twisted Stalk) - B.or.C\*  
*Stylophorum diphyllum* (Celandine Poppy) - B\*  
*Symplocarpus foetidus* (Skunk Cabbage) - B\*  
*Taenidia integerrima* (Yellow Pimpernel) - B  
*Talinum calycinum* (Fame Flower) - B,H  
*Tanacetum huronense* (Tansy) - A  
*Tellima grandiflora* (Fringecups) - A,H  
*Tephrosia virginica* (Goat's Rue) - B, I  
*Tetraneuris* (*Hymenoxys*) - herbacea - A  
*Teucrium canadense* (Wild Germander) - B  
*Thalictrum dasycarpum* (Meadow Rue) - B  
*Thalictrum dioicum* (Early Meadow Rue) - B  
*Thalictrum fendleri* (Fendler's Meadow Rue) - B  
*Thalictrum polygamum* (King of the Meadow) - B  
*Thalictrum venulosum* (Meadow Rue) - B  
*Thaspium trifoliatum* (Meadow Parsnip) - B  
*Thelypteris noveboracensis* (New York Fern) - A, H (MOSS)  
*Thelypteris palustris* (Marsh Fern) - A, H (MOSS)  
*Thelypteris simulata* (Massachusetts Fern) - A, H (MOSS)  
*Thermopsis caroliniana* (Carolina Lupine) - A, I  
*Thermopsis montana* (Small Yellow Lupine) - A, I  
*Tiarella cordifolia* (Running Foamflower) - A or B, H  
*Tiarella cordifolia* v. *collina* (Clumping Foam Flower) - A or B, H  
*Tiarella unifoliata* (Western Foamflower) - A, H  
*Tofieldia glutinosa* (False Asphodel) - B, H  
*Tofieldia racemosa* (False Asphodel) - B, H  
*Tradescantia hirsuticaulis* (Hairy Spiderwort) - B  
*Trautvetteria carolinensis* (Tassle Rue) - B  
*Triadenum* (*Hypericum*) - *virginicum* (Marsh St. John's-wort) - A, H  
*Trientalis borealis* (Starflower) - B\*  
*Trillium cuneatum* (Whippoorwill Flower) - C\*  
*Trillium erectum* (Purple Trillium) - C\*  
*Trillium grandiflorum* (Showy Trillium) - C\*  
*Trillium recurvatum* (Toad Trillium) - C\*  
*Trillium undulatum* (Painted Trillium) - C\*  
*Triosteum perfoliatum* (Wild Coffee) - C\*  
*Tripsacum dactyloides* (Gama Grass) - B or C  
*Trollius laxus* ssp. *laxus* (Spreading Globeflower) - B\*  
*Tsuga caroliniana* (Carolina Hemlock) - B  
*Typha latifolia* (Cattail) - B,H  
*Uvularia grandiflora* (Large-flowered Bellwort) - C\*  
*Uvularia perfoliata* (Strawbell) - C\*  
*Uvularia sessilifolia* (Wild Oats) - C\*  
*Vaccinium angustifolium* (Lowbush Blueberry) - B, H (moss)  
*Vaccinium corymbosum* (Highbush Blueberry) - B,H (moss)  
*Vaccinium macrocarpon* (Cranberry) - A, H (MOSS)  
*Vaccinium pallidum* (Hillside Blueberry) - B, H (moss)  
*Vaccinium vitis-idaea* v. *minus* (Mountain Cranberry) - A, H (MOSS)  
*Vancouveria hexandra* (*Vancouveria*) - D  
*Veratrum viride* (False Hellebore) - C\*  
*Verbena canadensis* (Rose Verbena) - A or B, H  
*Verbena hastata* (Blue Vervain) - A  
*Verbena stricta* (Hoary Vervain) - A or B, H  
*Verbesina alternifolia* (Wingstem) - A  
*Vernonia angustifolia* (Narrow-leaved Ironweed) - B  
*Vernonia arkansana* (*crinita*) - (Ironweed) - B  
*Vernonia fasciculata* (Ironweed) - B  
*Vernonia lettermannii* (Threadleaf Ironweed) - B  
*Vernonia missurica* (Missouri Ironweed) - B  
*Vernonia noveboracensis* (Ironweed) - B  
*Veronicastrum virginicum* (Culver's Root) - B,H  
*Viburnum alnifolium* (*lantanoides*) - (Hobblebush) - D\*  
*Viburnum nudum* v. *cassinoides* (Witherod Viburnum) - D\*  
*Viburnum nudum* var. *nudum* (Nannyberry Haw) - D\*  
*Viburnum opulus* v. *americanum* (American Cranberry Bush) - C\*  
*Viola brittoniana* (Britton's Violet) - B\*  
*Viola canadensis* (Canada Violet) - B\*  
*Viola labradorica* (Labrador Violet) - B\*  
*Viola pedata* (Bird's-foot Violet) - B  
*Viola pedatifida* (Prairie Violet) - B  
*Viola primulifolia* (Primrose-leaved Violet) - B\*  
*Viola pubescens* (Downy Yellow Violet) - B\*  
*Viola pubescens* v. *eriocarpa* (Downy Yellow Violet) - B\*  
*Viola rostrata* 'Rosea' (Long-spur Violet) - B\*  
*Viola sagittata* (Arrow-leaved Violet) - B  
*Viola striata* (Striped Violet) - B\*  
*Woodsia ilvensis* (Rusty Woodsia) - A, H (MOSS)  
*Woodsia obtusa* (Blunt-lobed Cliff Fern) - A, H (MOSS)  
*Woodwardia areolata* (Netted Chain Fern) - A, H (MOSS)  
*Woodwardia virginica* (Virginia Chain Fern) - A, H (MOSS)  
*Xanthorrhiza simplicissima* (Yellowroot) - B\*  
*Xerophyllum asphodeloides* (Turkeybeard) - B\*  
*Yucca filamentosa* (Adam's Needle) - A  
*Yucca glauca* (Soapweed) - A  
*Zenobia pulverulenta* (Dusty Zenobia) - A, H (MOSS)  
*Zigadenus glaucus* (White Camas) - D  
*Zizia aptera* (Heart-leaved Alexanders) - B  
*Zizia aurea* (Golden Alexanders) - B

Seed Collection Dates for Southern  
New England  
*Seed with x is best sown immediately or stored  
moist in plastic bags*

Latin Name	collect date	store moist
Hepatica acutiloba	5/1	x
Hepatica americana	5/1	x
Dicentra canadensis	5/20	x
Cardamine douglasii	5/21	x
Carex pensylvanica	5/21	
Carex plantaginea	5/21	x
Carex platyphylla	5/21	x
Claytonia caroliniana	5/21	x
Claytonia virginiana	5/21	x
Corema conradii	5/21	x
Cypripedium parviflorum	5/21	
Dicentra culcullaria	5/21	x
Mertensia virginica	5/21	x
Mitella diphylla	5/21	
Anemonella thalictroides	5/28	x
Carex atratiformis	5/28	x
Epigaea repens	5/28	x
Erythronium albidum	5/28	x
Erythronium americanum	5/28	x
Geum triflorum	5/28	
Osmunda cinnamomea	5/28	x
Osmunda claytoniana	5/28	x
Osmunda regalis v spectabilis	5/28	x
Shortia galacifolia	5/28	x
Tiarella cordifolia	5/28	x
Tiarella cordifolia v. collina	5/28	x
Cymophyllus fraseri	5/30	x
Phlox bifida	5/30	
Anemone(Pulsatilla)patens multifida	6/1	x
Caltha palustris	6/1	x
Dentaria diphylla	6/1	x
Dentaria laciniata	6/1	x
Dentaria maxima	6/1	x
Isopyrum biternatum	6/1	x
Phacelia bipinnatifida	6/1	
Trollius laxus ssp laxus	6/1	x
Anemone quinquefolia	6/7	x
Asarum canadense	6/7	x
Carex appalachica	6/7	x
Helonias bullata	6/7	x
Peltiphyllum peltatum	6/7	x
Sanguinaria canadensis	6/7	x
Stylophorum diphyllum	6/7	x
Thalictrum dioicum	6/7	x
Anemone multifida (dark pink)	6/10	

Anemone nuttalliana	6/10	
Erigeron compositus	6/10	
Heuchera richardsonii v. grayana	6/10	
Senecio antennariifolius	6/10	
Senecio obovatus	6/12	
Antennaria parlinii falax	6/14	
Antennaria rosea (microphylla) - pink	6/14	
Delphinium tricornes	6/14	x
Dicentra eximia	6/14	x
Geranium maculatum	6/14	x
Polygala paucifolia	6/14	x
Polystichum acrostichoides	6/14	
Saxifraga pennsylvanica	6/14	
Veratrum viride	6/14	x
Antennaria alpina	6/15	
Antennaria gaspensis	6/15	
Camassia scilloides	6/15	
Deschampsia caespitosa	6/15	
Linnaea borealis	6/15	x
Polemonium carneum	6/15	
Senecio aureus	6/15	
Fragaria virginica	6/16	
Dicentra formosa	6/20	x
Dryas octopetala	6/20	
Lewisia tweedyi	6/20	
Luzula acuminata	6/20	
Viola rotundifolia	6/20	
Actaea rubra	6/21	x
Aquilegia canadensis	6/21	x
Asarum caudatum	6/21	x
Chrysogonum virgin. v. virginianum	6/21	x
Dodecatheon lemoine	6/21	
Dryopteris campyloptera	6/21	
Dryopteris filix-mas	6/21	x
Dryopteris marginalis	6/21	
Houstonia serphyllifolia	6/21	
Hypoxis hirsuta	6/21	
Jeffersonia diphylla	6/21	x
Phlox divaricata	6/21	x
Polemonium reptans	6/21	
Polemonium reptans v villosum	6/21	
Pyxidantha barbulata	6/21	x
Silene carolin. ssp pensylvanica	6/21	
Vancouveria hexandra	6/21	
Viola striata	6/21	x
Camassia quamash	6/22	
Dodecatheon amethystinum	6/25	
Dodecatheon hendersonii	6/25	
Dodecatheon media	6/25	
Dodecatheon poeticum	6/25	
Dryopteris carthusiana	6/25	
Geum rivale	6/25	

Deparia acrostichoides	7/22	
Draba ramosissima	7/22	
Matteuccia struthiopteris (penns.)	7/22	
Mimulus guttatus	7/25	
Angelica atropurpurea	7/28	
Athyrium nipponicum 'Burgundy Lace'	7/28	
Athyrium nipponicum Ursula's red	7/28	
Cornus alternifolia	7/28	
Dennstaedtia punctilobula	7/28	
Fothergilla major	7/28	x
Penstemon hirsutus pygmaeus	7/28	
Thermopsis caroliniana	7/28	
Trillium cuneatum	7/28	x
Trillium erectum	7/28	x
Trillium recurvatum	7/28	x
Trillium simile	7/28	x
Vaccinium corymbosum	7/28	
Vaccinium pallidum	7/28	
Camptosorus rhizophyllus	7/30	
Osmorhiza claytonii	7/30	
Polystichum muniticum	7/30	
Trillium erectum f albiflorum	7/30	x
Actaea pachypoda	8/1	x
Clematis albicoma	8/1	x
Clematis crispa	8/1	x
Cornus canadensis	8/1	
Cystopteris bulbifera	8/1	
Dalibarda repens	8/1	x
Diphylleia cymosa	8/1	x
Disporum hookeri	8/1	x
Euphorbia corollata Short and Sweet	8/1	
Gaultheria hispidula	8/1	
Hydrophyllum canadensis	8/1	x
Hydrophyllum virginianum	8/1	x
Iris douglasiana	8/1	
Iris lacustris	8/1	x
Maianthemum canadense	8/1	x
Mertensia platyphylla	8/1	
Phlox pilosa ssp ozarkana	8/1	
Polemonium van-bruntiae	8/1	
Rubus odoratus	8/1	x
Trillium cernuum	8/1	x
Trillium flexipes	8/1	x
Viola brittoniana	8/1	x
Sedum nevi	8/2	
Anemone virginiana	8/5	x
Adiantum viride-montanum	8/6	
Aster acuminatus	8/6	
Fothergilla gardenii	8/6	x
Spigelia marilandica	8/6	x
Viola brittoniana	8/6	x

Adiantum pedatum	8/7	
Baptisia bracteata v. leucophaea	8/7	
Clematis ochroleuca	8/7	x
Clintonia umbellulata	8/7	x
Coptis groenlandica (NH)	8/7	x
Disporum maculatum	8/7	x
Epilobium angustifolium	8/7	
Fothergilla gardenii	8/7	
Spigelia marilandica	8/7	x
Trientalis borealis	8/7	x
Trillium viride v luteum	8/7	x
Blephilia hirsuta	8/10	
Clematis pitcheri	8/10	
Clematis reticulata	8/10	
Clintonia umbellulata	8/10	x
Cocculus carolinianus	8/10	
Echinacea laevigata	8/10	
Iris verna	8/10	x
Iris verna v smalliana	8/10	x
Monarda 'Petite Wonder'	8/10	
Parnassia palustris	8/10	
Philadelphus microphyllus	8/10	
Phlox maculata	8/10	
Streptopus amplexifolius v americanus	8/10	x
Woodsia ilvensis	8/10	
Zigadenus exaltatus	8/10	
Acer pensylvanicum	8/14	
Aletris farinosa	8/14	
Allium cernuum	8/14	
Aralia racemosa	8/14	
Baptisia australis	8/14	
Caulophyllum thalictroides	8/14	x
Clintonia borealis	8/14	x
Corallorhiza maculata	8/14	
Disporum smithii	8/14	
Drosera rotundifolia	8/14	
Gaylussacia brachycera	8/14	
Medeola virginiana	8/14	
Myrica pennsylvanica	8/14	
Podophyllum peltatum	8/14	x
Sambucus canadensis	8/14	
Streptopus roseus	8/14	x
Thelypteris noveboracensis	8/14	
Triosteum perfoliatum	8/14	x
Uvularia perfoliata	8/14	x
Uvularia sessiliflora 'Variegata'	8/14	x
Uvularia sessilifolia	8/14	x
Xerophyllum asphodeloides	8/14	x
Erigeron tweedyi	8/15	
Gaillardia aristata	8/15	
Geum peckii	8/15	
Napaea dioica	8/15	

<i>Liatris spicata</i>	9/14	
<i>Lilium superbum</i>	9/14	
<i>Lobelia cardinalis</i>	9/14	
<i>Lobelia siphilitica</i>	9/14	
<i>Lonicera sempervirens</i>	9/14	
<i>Lysichiton americanum</i>	9/14	x
<i>Magnolia ashei</i>	9/14	
<i>Magnolia virginiana</i>	9/14	
<i>Monarda fistulosa</i>	9/14	
<i>Nothochelone nemorosa</i>	9/14	
<i>Parthenocissus quinquefolius</i>	9/14	
<i>Polygonatum pubescens</i>	9/14	x
<i>Sabatia kennedyana</i>	9/14	
<i>Silphium perfoliatum</i>	9/14	
<i>Verbena stricta</i>	9/14	
<i>Viola labradorica</i>	9/14	x
<i>Viola pubescens v eriocarpa</i>	9/14	x
<i>Viola rostrata (pink)</i>	9/14	x
<i>Acer saccharum</i>	9/15	
<i>Adiantum ped. ssp. subpumilum</i>	9/15	
<i>Adiantum pedatum v aleuticum</i>	9/15	
<i>Asclepias viridis</i>	9/15	
<i>Baptisia alba (lactea)</i>	9/15	
<i>Baptisia sphaerocarpa</i>	9/15	
<i>Calopogon tuberosus</i>	9/15	
<i>Coreopsis tripteris</i>	9/15	
<i>Iris prismatica v. rosea</i>	9/15	
<i>Iris setosa nana</i>	9/15	
<i>Iris tenax</i>	9/15	
<i>Physostegia virginiana</i>	9/15	
<i>Ruellia ciliosa</i>	9/15	
<i>Sedum divergens</i>	9/15	
<i>Tephrosia virginica</i>	9/15	
<i>Viburnum dentatum</i>	9/15	
<i>Echinacea tennesseensis</i>	9/20	
<i>Euphorbia purpurea</i>	9/20	
<i>Heliopsis helianthoides</i>	9/20	
<i>Heterotheca graminifolia</i>	9/20	
<i>Panax quinquefolius</i>	9/20	x
<i>Polygonatum bifl. v. commutatum</i>	9/20	x
<i>Quercus prinoides</i>	9/20	
<i>Taxus canadensis</i>	9/20	
<i>Tofeldia racemosa</i>	9/20	
<i>Agastache rupestris</i>	9/21	
<i>Amsonia ludoviciana</i>	9/21	
<i>Amsonia montana</i>	9/21	
<i>Amsonia rigida</i>	9/21	
<i>Cercis canadensis</i>	9/21	
<i>Chionanthus virginicus</i>	9/21	x
<i>Cimicifuga racemosa</i>	9/21	x
<i>Delphinium exaltatum</i>	9/21	x
<i>Kalmia angustifolia</i>	9/21	

<i>Ledum groenlandicum</i>	9/21	
<i>Leiophyllum buxifolium</i>	9/21	
<i>Liatris punctata</i>	9/21	
<i>Liatris pycnostachya</i>	9/21	
<i>Liatris scar. v. novae-angliae</i>	9/21	
<i>Lilium philadelphicum</i>	9/21	
<i>Monarda media</i>	9/21	
<i>Passiflora incarnata</i>	9/21	
<i>Paxistima canbyi</i>	9/21	
<i>Penstemon dissectus</i>	9/21	
<i>Polygonatum biflorum</i>	9/21	x
<i>Quercus ilicifolia</i>	9/21	x
<i>Sarracenia flava</i>	9/21	
<i>Sarracenia purpurea</i>	9/21	
<i>Sarracenia rubra ssp. jonesii</i>	9/21	
<i>Senna hebecarpa</i>	9/21	
<i>Spiraea tomentosa</i>	9/21	
<i>Veronicastrum virginicum</i>	9/21	
<i>Liatris aspera</i>	9/23	
<i>Amsonia illustris</i>	9/24	
<i>Amsonia tabernaemontana</i>	9/24	
<i>Rudbeckia laciniata</i>	9/24	
<i>Coreopsis rosea</i>	9/25	
<i>Eryngium yuccifolium</i>	9/25	
<i>Mimulus lewisii</i>	9/25	
<i>Coreopsis rosea</i>	9/28	x
<i>Crateagus jonesiae</i>	9/28	
<i>Cypripedium parviflorum</i>	9/28	
<i>Cypripedium pubescens</i>	9/28	
<i>Gentiana clausa</i>	9/28	
<i>Hibiscus militaris (laevis)</i>	9/28	
<i>Hibiscus moscheutos</i>	9/28	
<i>Leiophyllum buxifolium</i>	9/28	
<i>Ratibida pinnata</i>	9/28	
<i>Vernonia noveboracensis</i>	9/28	
<i>Zizia aptera</i>	9/28	
<i>Aesculus pavia</i>	10/1	
<i>Amsonia ciliata</i>	10/1	
<i>Amsonia ciliata v. filiformis</i>	10/1	
<i>Amsonia hubrichtii</i>	10/1	
<i>Andromeda polifolia</i>	10/1	
<i>Asclepias amplexicaulis</i>	10/1	
<i>Baptisia tinctoria</i>	10/1	
<i>Calycanthus floridus</i>	10/1	
<i>Campsis radicans</i>	10/1	
<i>Chasmanthium latifolium</i>	10/1	
<i>Chelone glabra</i>	10/1	
<i>Chelone obliqua</i>	10/1	
<i>Clematis texensis</i>	10/1	
<i>Cornus racemosa</i>	10/1	
<i>Cypripedium acaule</i>	10/1	
<i>Cypripedium kentuckiense</i>	10/1	

Dioscorea quaternata	10/1	
Eragrostis spectabilis	10/1	
Euonymus americanus	10/1	
Eupatorium fistulosum	10/1	
Gentiana andrewsii	10/1	
Gentiana autumnalis	10/1	
Glaucidium palmatum	10/1	x
Goodyera pubescens	10/1	
Helianthus microcephalus	10/1	
Heuchera alba	10/1	
Hypericum frondosum	10/1	
Hypericum kalmianum	10/1	
Hypericum prolificum	10/1	
Ipomopsis aggregata	10/1	
Iris versicolor	10/1	
Iris virginica	10/1	
Leucothoe racemosa	10/1	
Liatris cylindracea	10/1	
Lilium michiganense	10/1	
Magnolia grandiflora	10/1	
Magnolia macrophylla	10/1	
Mimulus ringens	10/1	
Panicum virginicum	10/1	
Parthenium integrifolium	10/1	
Penstemon eatonii	10/1	
Pogonia ophioglossoides	10/1	
Pycnanthemum pilosum	10/1	
Pycnanthemum tenuifolium	10/1	
Rhus coppalinum	10/1	
Ruellia humilis	10/1	
Sarracenia alata	10/1	
Sarracenia leucophylla	10/1	
Scutellaria incana	10/1	
Silphium dentatum	10/1	
Silphium terebinthinaceum	10/1	
Silphium trifoliatum	10/1	
Sorbus americanus	10/1	
Sorbus americanus	10/1	
Symplocarpus foetidus	10/1	x
Verbesina alternifolia	10/1	
Vernonia fasciculata	10/1	
Viburnum nudum var. cassinoides	10/1	x
Viburnum nudum var. nudum	10/1	x
Viburnum opulus var. americanum	10/1	
Viburnum prunifolium	10/1	x
Viola striata	10/1	x
Zenobia pulverulenta	10/1	
Zizia aurea	10/1	
Lobelia cardinalis alba	10/2	
Lobelia cardinalis 'Eco Pink'	10/2	
Cypripedium candidum	10/5	
Eupatorium rugosum	10/5	

Aralia spinosa	10/7	
Aster divaricatus	10/7	
Campanula divaricata	10/7	
Gaultheria procumbens	10/7	
Helianthus giganteus	10/7	
Hydrangea arborescens	10/7	
Potentilla fruticosa	10/7	
Pycnanthemum muticum	10/7	
Rudbeckia fulgida v sullivanii	10/7	
Rudbeckia subtomentosa	10/7	
Rudbeckia triloba	10/7	
Leiophyllum buxifolium	10/8	
Aster concolor	10/10	
Aster patens	10/10	
Dioscorea villosa	10/10	
Eupatorium hyssopifolium	10/10	
Helenium autumnale	10/10	
Helenium hoopsii	10/10	
Solidago flexicaulis	10/10	
Solidago nemoralis	10/10	
Vernonia baldwinii	10/10	
Vernonia crinita (arkansana)	10/10	
Vernonia missurica	10/10	
Andropogon gerardii	10/13	
Echinacea simulata	10/13	
Monarda punctata	10/13	
Pieris floribunda	10/13	
Andropogon glomeratus	10/14	
Asimina triloba	10/14	
Aster umbellatus	10/14	
Astilbe biternata	10/14	
Campanulastrum americanum	10/14	
Ceanothus americanus	10/14	
Cephalanthus occidentalis	10/14	
Cornus florida	10/14	
Echinacea purpurea	10/14	
Eriogonum allenii	10/14	
Franklinia alatamaha	10/14	x
Hamamelis virginiana	10/14	x
Hydrangea quercifolia	10/14	
Magnolia tripetala	10/14	
Mitchella repens	10/14	
Opuntia humifusa	10/14	
Oxydendrum arboreum	10/14	
Parnassia grandiflora	10/14	
Pieris floribunda	10/14	
Rhododendron canadense	10/14	
Rhododendron vaseyi	10/14	
Rosa carolina	10/14	
Rosa virginiana	10/14	x
Solidago rigida	10/14	
Stenanthium gramineum robustum	10/14	x