



# Bare Root Perennials

*Storage & Planting Information Guide*



*Daylily*



*Peony*



*Hosta*



# Our History

*Getting to Know Simple Pleasures®*



Simple Pleasures® was introduced the Fall season of 1998. It was developed based on 80 plus years of marketing experience in North America to garden centers, mail order and mass merchants. Our mail order background has given us a tremendous insight into the gardening marketplace and we use the same successful approach towards Simple Pleasures® with quality, uniqueness, exclusive varieties and new introductions.



## 10 Reasons to Buy from Simple Pleasures

1. A sales force to directly cover all our customer needs.
2. The strongest guarantee in the business.
3. A complete trial garden making sure our varieties are true to type and quality is second to none.
4. A full color plant tag inventory.
5. A complete photo library for customer use.
6. Servicing wholesale growers, small retailers, mail-order companies and garden centers.
7. Great distribution channels with warehouses located in the United States, Canada, and Holland.
8. Our own technical support staff for your horticultural assistance.
9. The largest variety offering available from one source, whether it be bulbs, perennials, or plugs.
10. New and exclusive varieties every year, grown by our own contract growers.

## Best Selling Bulbs



*Lilies*



*Caladiums*



*Dahlias*

## Our Guarantee

We guarantee our products to be healthy and true to name as described in our catalog. We are prepared to stand behind this warranty, with proper proof, to either replace the product or refund it for full purchase price, at our discretion.

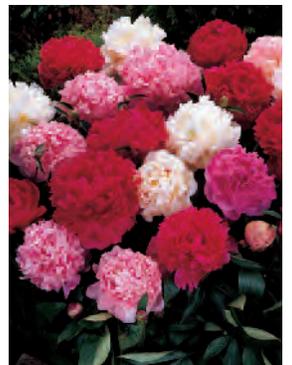
## Best Selling Perennials



*DayLilies*



*Hosta*



*Peonies*

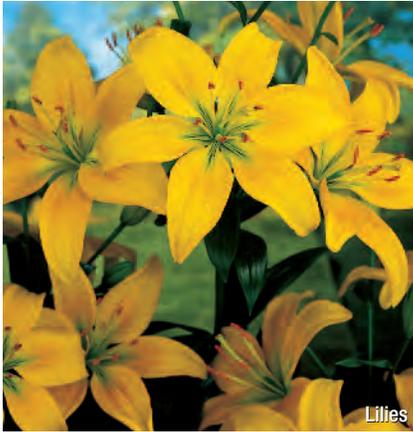
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*Although Simple Pleasures has made every effort to ensure the accuracy of the information in this guide, we make no guarantee, written or implied as to the procedures contained within.*

# Bulb & Root Types

*What do the different types of bulb & root systems mean?*



Lilies

## BULBS:

A true bulb is a thickened, fleshy, and commonly subterranean bud, usually emitting roots from its under side and the stems, flowers, and foliage from the crown. The term "bulb" applies to a large class of flowering and ornamental bulbous-like plants in their dormant condition such as corms, tubers, rhizomes and pips.

### Examples:

True Bulbs: Lilies, Tulips, Onions  
Tuber: Dahlias  
Pips: Lily of the Valley



Bearded Iris

## RHIZOMES:

An underground stem with branching close to the soil surface. This stem produces roots, stems, leaves and flowers along its length.

Examples:  
Bearded Iris,  
Eremurus



Crocosmia

## CORM:

An underground bulb-like portion of the stem of a plant consisting of fleshy tissue with a bud at the top.

### Examples:

Crocus, Gladiolus,  
Crocsmia



Lupines

## TAP ROOT:

A strong nearly perpendicular main root that carries the plant axis straight into the ground. All other roots of the plant are secondary to it.

Examples:  
Hibiscus, Lupines



Clematis

## FIBROUS ROOTS:

Mainly consists of thread-like, profusely branched roots with no main or tap-root development.

### Examples:

Coreopsis, Clematis



Paeonia

## ROOTS WITH EYES:

A form of rhizome where the size of the plant grade is determined by the number of buds or eyes. Such as 1 to 2 eye or 2 to 3 eye divisions.

### Examples:

Astilbe, Dicentra, Hosta, Paeonia



Dahlia

## TUBER:

A short, thickened, fleshy part of an underground stem, where new plants develop from buds, or eyes.

### Examples:

Dahlia, Potato



Dianthus & Buddleia

## POTTED PLANTS:

This is a group of plants that usually transplant better as potted versus bare root or when the plant is produced from tissue culture.

# Bare Root Perennial Storage & Planting Information

## IMPORTANT MESSAGE:

- Plants should be inspected immediately upon arrival.
- Occasionally during storage material can be damaged. If you should detect any problems, please inform us within 5 working days of receipt of the shipment.
- Remove questionable product to avoid further contamination.
- Additional storage of the product is not recommended due to fluctuations in temperature.
- After inspection leave the boxes open, so excessive moisture can evaporate.
- Put the cartons away from extreme ventilation and direct sunlight because this will dehydrate your plants.
- If additional storage time is needed, try to keep the time to a minimum (no more than 2 or 3 days) and try to maintain our suggested storage temperature of 32-34°F (0-2°C). You can leave the boxes open because the temperature is above freezing.
- Product that is intended to be planted during the summer months, must be stored in closed cartons at a constant store temperature of 30-32°F (-1-0°C) until one or two days before planting.

- Approximately 48 hours before planting the cartons should be moved to an area with a cool temperature, preferably 45-55°F (8-13°C) to slowly defrost the plants. At that time the cartons should be opened. Do not tear the plants apart when the plants are not fully defrosted. This will cause serious damage to your planting stock.

## STORAGE:

- Insulated room
- Dark
- Closed
- No ventilation
- Leave space between boxes/pallets
- Never put roots that were stored above freezing into a cooler below freezing.
- Roots which were in storage for weeks slowly go out of dormancy and start to sprout. Once they break dormancy, severe structural damage can occur.
- Even roots which were in storage below freezing, but thawed out should not be re-frozen.
- Instead, open the boxes in a cooler above freezing.

# Important Steps Before Planting the Bare Roots.

## GENERAL GUIDE LINES FOR POTTING SOIL:

- Avoid extremely acid soils like 70-100% peat/bark mixes because the pH of the soil is way too low (sometimes even below 4). If the pH level is too low the perennial roots will be stunted and cannot absorb the nutrients in the soil which will result in distorted foliage texture and very small plants. It will cause the root development to stay behind.
- Good mixes provide 40-50% garden soil, 40-50% peat and 10% sand. Optional are Perlite/Vermiculite and fertilizers.
- For growing perennials in a pot culture we need to set the pH between 5.3 and 6.3 for optimal results.
- If the base pH value of the soil mix is still on the lower side you should add lime (CaCO<sub>3</sub>) to the soil.
- Also quite important is the electrical conductivity (EC value) of the soil which measures the salt concentration of the soil.
- Ideal values range between 0.75 and 1.1. The higher the number, the more salt is present and vice versa.
- During the season it is very important to check soil regularly because when extreme EC values are measured for days the roots very easily fry or reversed Osmosis takes place and plants wilt instantly.
- Critical moments are when slow release fertilizers (3-4 months) release their salts all at once due to warm weather/indoors while not being watered. The EC value measured can reach up to 3.0 and if proper action is not taken (watering, always measure EC of the water you are using) you can lose your plants when this occurs.

## PLANTING TIME

- Use pots with a cross bottom (drainage holes on bottom and sides as well)
- For frozen shipments it is important to thaw out the roots before planting. Frozen roots do not take water for several days while sprouting might take place already. This will cause the plant to dehydrate.
- Most of the bare roots are treated with a fungicide during the washing process in Holland, but we recommend to add some fungicide while watering in your roots immediately after planting.
- Make sure that the roots are planted deep and firm enough. Watering in the roots will provide optimal contact between roots and soil.
- When the roots are watered in thoroughly they can be left alone for several days until you see some growth.
- Many times, excessive watering causes loss of planting stock.
- Some perennials need to be grown inside for at least 2 weeks until they start to root well or simply be protected from frost where others just need some shade to avoid severe burning of the new growth. The majority of perennials are tough enough to grow in the open and face the elements.

# Specific Bare Root Perennial & Bulb Planting Information

## ACANTHUS

- Protect from extreme cold winter temperatures, especially during wet periods.
- During first year of planting the crowns should be protected as well.
- Root pruning can be done to fit container.

## ACHILLEA

- Easy to grow.
- Withstands drought conditions.
- Hardy in zones 3-8.
- Prefers well drained poor soil in full sun.

## ACONITUM

- Apply fungicide during the planting process.
- Plant the crowns just below soil level.
- If started indoors the temperatures should not be higher than 45-50°F (8-10°C)
- After watering in the roots thoroughly you need to let them settle for a couple of days. (3-5 days)
- Plants dislike hot and humid conditions.

## ADENOPHORA

- Plant in rich well-drained soil.
- Full sun to partial shade.
- Better for the south.

## AEGOPODIUM

- Invasive rhizomes.
- No particular soil preference.
- Partial shade.
- Do well in the full sun too and don't reproduce so fast therefore not so invasive.



## AGAPANTHUS

- Protect from extreme cold winter temperatures, especially during wet periods.
- Use fungicide and place indoors until temperatures outside rise.
- Good drainage is important.
- Full sun during active growth, but protection from direct sunlight is required during establishing roots and sprouting (1-2 weeks)

## ALOCASIA

- Storage, soil preparation and planting procedure is similar to Caladium culture.
- Do not scoop Alocasia.
- Grow at highest intensity of light.
- Keep growing mixture moisture saturated.
- For fertilization, pest control and finished product care, see Caladium instructions.



## ALSTROEMERIA

- Protect from extreme cold winter temperatures, especially during wet periods.
- Water in thoroughly with fungicide. Wait with additional watering until the plants start to sprout. Indoor start for at least 2-3 weeks.
- Good drainage.
- Plants prefer humus soil and full sun during active growth.

## AMSONIA

- Disease and insect resistant.
- Full sun to partial shade.
- Use a moist retentive, well drained soil.
- Cut back the foliage to keep the plants nice and sturdy.

## ANEMONE

- Do not plant the roots too deep. (1/2" of soil)
- Water in with fungicide and leave the plants alone for several days (5-7 days).

## ANGELICA

- Partial shade and moist retentive soil.
- Monocarpic plants (die back after seeding).
- Fragrant herb.

## ANTHEMIS

- Has fragrant foliage.
- Full sun and sandy, well drained soil.
- Avoid too much food since the plants start to grow rapidly and fall apart.

## AQUILEGIA

- Plant the crowns at soil level (roots below), if covered totally they rot.
- Water in with fungicide and leave them to settle (5-7 days)
- Should not be started wet and cold. Start indoors between 45-50°F (8-10°C)

## ARABIS

- Great plant for the rock garden because of its leaf rosettes and shallow rooting.
- Good for the Northern part. Plants do not do well in the south.
- Full sun and sandy, well-drained soil.
- Overwinter the plants with minimal water to avoid rotting.

## ARMERIA

- Full sun to partial shade.
- In the southern parts of America they prefer partial shade.
- No particular soil preference as long as it is well drained.
- Overwinter the plants with minimal water to avoid rotting.

## ARUNCUS

- Easy plants, but only the *A. aethusifolius* should be treated with fungicide while the plants are watered in.
- In case these plants are planted late in the season you need to watch out for *Rhizoctonia* threat.

## ASARUM

- Rhizomes.
- Fragrant roots and foliage that resembles Ginger when crushed.
- Moist retentive soils that are slightly acidic (pH5).
- Good drainage is very important.
- Full shade.
- Great for naturalizing.



## ASCLEPIAS

- Plant the crown at soil level (roots below).
- Avoid wet and cold winter circumstances because the plants will rot away very easily.
- During dry winter periods you need to protect the eyes from dehydrating.
- Use fungicide and let the plants sprout before active watering.
- Indoor start will give best results.

## ASTILBE

- Easy perennial, but awareness of *Rhizoctonia* is important. Preventive spray doesn't hurt.
- Plants thrive well in acidic conditions, but needs to be monitored carefully.
- Most problems occur when pH is too low and EC values rise. This is the moment when *Rhizoctonia* threat is present. Make sure the 1<sup>st</sup> inch of soil is dry, so it won't spread very easily. Also space container well enough.

## ASTRANTIA

- Apply fungicide and do not plant too deep (1/2" of soil)
- Place in filtered sunlight after planting.
- Plants can be grown in a 1/2 gallon container.

## ATHYRIUM

- Treat with fungicide while watering in the plant thoroughly.
- You need to leave the roots alone for at least a week because the ferns are very slow to start from bare root. Preferably indoors for at least 2-3 weeks.
- Best in moist retentive, slightly acidic soil.
- Do not expose the plants to direct sunlight especially during the first growth.
- Variegated varieties tend to do better in the sun.

## BAPTISIA

- Prefers full sun and moist retentive soil.
- They do well in most soils as long as they have good drainage.
- Variegated varieties tend to do better in the sun.

## BERGENIA

- Plants prefer moist conditions, but do not tolerate standing water, this way they'll rot very easily.
- Avoid heavy, rich soils. Sandy soils that are slightly amended with organic matter give the best growing result.
- Plants prefer shade, but do tolerate the sun in the morning. The heat tolerance isn't great.

## BOLTONIA

- Sun lovers.
- When grown in shade to partial shade you need to support the plants due to extreme elongation.
- Prefer a moist, organic soil.

## BRUNNERA

- Apply fungicide by watering in the roots.
- Leave the roots alone for 3-5 days until you see some growth.
- Root pruning to fit the pot is OK to do because curled up roots in this case will rot and attack the plant from the bottom up.

## CALADIUM

- The quality of the tubers must be preserved by storing at a temperature of 70°F (21°C) or slightly higher until planting. Do not expose the bulbs to draft at any time.
- Bulbs for pot plant production which show one dominant center bud must be scooped so that more sprouts will develop for a fuller pot plant.
- Grow bulbs in a soil mix with a high water retention character such as Pro-Mix. Plant upright with at least 1" of soil over the bulb.
- Grow at a minimum average temperature of 70°F (21°C) with night temperature never below 60°F (16°C). Most grow best with a minimum light intensity of 2,500 ft. candles of light.
- Top dress fertilization of 14-14-14 once a week after sprouting rather than mixing in the soil to prevent salt injury at high temperatures.
- Growing plants may be subject to the presence of mites, aphids or mealy bugs which must be treated as soon as detected with an appropriate insecticide.
- Growing plants and finished products should never be exposed to drafts or temperatures below 60°F (16°C).



## CALLA LILIES (*Zantedeschia*)

- Plant in a well drained sterilized planting medium with a pH of 6-6.5. Plant bulbs 1" below the soil line.
- Keep growing medium moist (not wet) at all times. Do not overwater to prevent development of erwinia.
- Grow at 70°F (21°C) in a high light intensity greenhouse.
- Fertilize with a top-dress 20-20-20 fertilizer once every two weeks after germination.

## CALLIRHOE

- Full sun in almost any soil that is well-drained.
- They can handle drought pretty good, but for best results you need to plant them not warmer than a hardy zone 7.

## CALTHA

- Wet plantings and rich organic, well irrigated gardens are best.
- For vigorous growth the plants need the full sun.



## CAMPANULA

- Immediately plant these roots since they do not store well. We tried to eliminate storage problems by shipping only one ship date.
- Preferably start the plants indoor and leave them there for up to 2 weeks.
- Apply fungicide while watering in the roots. Leave the roots for a while until you see breaking buds (5-7 days).
- You can cut back the taller varieties, so they come back more compact. You also stimulate the plants for more vegetative growth.

## CANNA

- Plant 2-3 eye roots in a 2 gallon container; Plant 1-2 eye root in a 1 gallon container.
- Use a fertile, humusy, but well-drained soil mix.
- Drench pots after planting.
- Grow at a temperature of 70°F (21°C) or higher in a high light intensity greenhouse.
- Keep well watered at all times.
- Fertilize weekly with a 20-20-20 top dress once initial sprouts have developed to approximately 2".
- Place containers outdoors in a sunny location when day temperatures exceed 65°F (18°C) & night temperatures do not go below 55°F (13°C).

## CARDAMINE

- Great for naturalizing.
- Prefer a moist and cool, well drained soil. Shade to partial shade.

## CENTAUREA

- Plant right away and not too deep and keep crown at soil level to avoid rotting.
- Apply fungicide and wait for breaking buds.

## CENTRANTHUS

- Plants do well in poor, alkaline soils. If planted in rich circumstances the plants will grow tall and sloppy. Avoid shade for the same reasons.

## CERASTIUM

- Avoid heat and humidity.
- Partial shade in the more southern areas.
- Plants grow best in well drained poor soil.
- Plants dislike winter wetness.

## CERATOSTIGMA

- Plants do best in partial shade.
- Plant in any soil that is well drained.
- Plants dislike winter wetness.

## CHELONE

- Preference for application with fungicide especially bare roots. They start slow for such a vigorous plant during active growth.
- They do not need a lot of water during the start, but they need plenty during the active growing season.
- Good results in humus enriched soils.
- Plants love the sun, but should not be exposed to direct sunlight the first 2 weeks.

## CHRYSOGRONUM

- Plants do well in the shade, but tolerate sun as well, as long as they are kept moist.
- Mulching in the more southern areas is recommended.
- They will keep on blooming throughout the Summer, but it is fairly weak compared to the Spring.
- Avoid winter wetness.

## CIMICIFUGA

- Fairly easy plants, but be aware of crown rot that can occur when the plants just start to grow. Plants are particularly susceptible when there is a lot of water standing, bad drainage, etc.
- Preventive spraying with a fungicide against root and crown rot is recommended.

## CLEMATIS

- Keep plants sealed in plastic and cool right until potting time to prevent dehydration of the roots.
- Once unpacked, moisten the plants to ensure that the roots do not dry out.
- Use a fertile, well drained potting medium with a pH of 6.0 to 6.5. Soil must be moist at all times but cannot be waterlogged.
- Place one plant in a 1 gallon pot, ensuring that the roots are well spread within the medium while the initial stalk of the vine is exposed. Grow at high light intensity at a temperature of 62-72°F (17-22°C). Once the initial shoot is 8-10", pinch the growth back to the first fully formed node and attach the plant to a growing support. Fertilize with 14-14-14 bi-weekly.
- Apply preventative insecticide against aphids and other usual pests, once plant has been established.



## COLOCASIA

- Growing and handling information similar to Alocasia.
- Note: Some Alocasia and Colocasia varieties are being supplied as started plants in 4" pots. Upon arrival unpack immediately. Transplant to larger containers if necessary. Water thoroughly and grow in a high intensity light area. After five days apply a top-dress fertilizer of 14-14-14 and continue fertilization bi-weekly.

## CONVALLARIA

- Let the roots start to develop and watch the buds break before you get too excited with the watering can.
- Humus enriched soil has the preference, but watch out for low pH values even though established plants don't mind, bare roots do mind.
- Convallarias are very slow to get going and they will only suffer more when pH ranges will drop below 5 or EC values exceed 1.5.
- Give our famous Lily of the Valley some time and it will perform.

## COREOPSIS

- Not the easiest plant from bare root, but here are some tricks as well.
- Most important is to plant upon arrival.
- Water in with a fungicide and let the plants start to grow with only the water given during planting. For best results they should be placed indoors for up to 2 weeks.
- During active growth the plants can be trimmed all the way down for better vegetative growth.

## COSMOS

- Avoid cold and wet circumstances.
- Apply fungicide and plant crown at soil level (roots below). Start indoors 40-50°F (5-10°C)
- Do not give additional water until you see breaking buds.
- Good drainage is important because sitting water will cause the roots to rot.
- Slow to establish, but once growing it can not be stopped.

## CRAMBE

- After planting you need to protect the crowns from the wind because they dehydrate fairly quickly.
- Excessive moisture in the early stages after planting can cause the crown to rot, give this plant some kind of protection until it is growing.
- The soil should not be acidic, but rather neutral to slightly alkaline.

## CROCOSMIA

- Plant 5 to 7 bulbs in a 1 gallon container using a fertile soil mix with ultimate drainage.
- Drench after planting and grow at high light intensity at a temperature of 70-85°F (21-29°C).
- Apply top-dress fertilizer bi-weekly and insecticide as pests necessitate.



## DAHLIA

- Store Dahlias at 45-50°F (7-10°C) until planting.
- Use a well-drained sterilized planting medium with a 7.0 pH.
- Plant the tuberous root with the crown just barely above the soil mix.
- Keep moist but not wet.

## DAHLIA (cont.)

- Grow at 72°F (22°C) but not over 78°F (26°C) during the daytime, and not below 60°F (16°C) at night.
- Pinch the appropriate variety of dahlia at the third and fourth node of the primary and strong secondary shoot for a more compact and attractive container plant.
- Once the shoots have developed to approximately 2", start a weekly fertilizing program of Osmocote 14-14-14 with a top dress application.
- Use appropriate insecticide when pests have been detected.



## DARMERA

- Plant in heavy soils along streams or great for naturalizing in well-drained, moist soil.
- In the more southern climate you need to mulch and keep the soil cool.
- The bare root plants need to be watered in well with a fungicide and left alone for at least a week in order to break dormancy.
- After the first root development the plants need to be kept wet. Avoid low pH and high levels of salt because this will burn the new growth very easily.

## DELOSPERMA

- Plant in full sun and poor sandy soils that are well drained.

## DELPHINIUM

- Immediate planting is required. These roots do not hold long in storage!
- Apply fungicide after planting and leave them to settle down for several days (5-7 days).
- Start indoors between 40-50°F (5-10°C). Monitor temperature carefully as they are very susceptible to root and crown rot.

## DICENTRA

- Humus enriched soil that is well drained.
- For late Spring shipments we recommend the use of fungicide.
- Root pruning can be done to fit the pots.
- The D.Formosa types need a little extra attention at the start because they tend to rot easier when there is too much water sitting in the pots.

## ECHINACEA

- Apply fungicide after planting. Cover the roots with 1/2" of soil.
- Leave the plants without watering for a couple of days (3-5 days).
- Too much fertilizer will cause extreme elongation.

## ECHINOPS

- Do not plant too deep (1/2" below soil level)
- Any soil will do.

## EPIMEDIUM

- Small plants that will not fill 1 gallon containers the first year.
- Plant 1/2" below soil level. Apply fungicide.
- Once established they can grow pretty much everywhere since they are drought tolerant. They can handle the full shade in most conditions as well. In their native habitat they thrive best in well drained humus and moist soil conditions.

## EREMURUS

- Not very hardy. Cold and moist situations will cause rotting crowns.
- In case you need to over winter these plants you need to apply a fungicide.
- Cover the roots and main bud with 1" of well-drained soil enriched with humus.
- Plants need the full sun, but not right after planting.

## ERIGERON

- Plants do best in full sun and any soil that isn't too rich in fertilizer.
- In order to maintain nice clumps without too many diseases (mainly virus) you need to rejuvenate every 2-3 years.

## ERYNGIUM

- Plant immediately.
- The crown of the plant should be at soil level (roots below).
- Apply fungicide while watering in roots. Let the roots settle indoors for up to 2 weeks and do not water the first couple of days.
- If planted outside protect the crowns from strong winds because sprouting buds dry out very quick.
- Well drained soil that is neutral (pH 6.5-7.0)

## EUPATORIUM

- Well drained soil that is well amended with organic matter.

## EUPHORBIA

- Plant immediately.
- Plant the crowns or root base at soil level (roots below). Avoid cold & wet conditions.
- Treat with fungicide and place indoors for up to 2 weeks. Do not heat the greenhouse too warm 40-50°F (5-10°C).
- They prefer an average to poor soil mix that is well drained.
- Once the plants are growing they can handle quite a bit of heat as long as the humidity is not too high.

## FILIPENDULA

- Plants prefer moist conditions when actively growing, but you need to watch out when you start with a bare root because they do not like the wet circumstances when they try to get going. Soil needs to be enriched with humus and well drained as well.

## FRAGARIA

- Full sun to partial shade in any soil that is well drained.
- Avoid high humidity and heat.

## GERANIUM

- Apply fungicide when watering the roots.
- Plant the G.cinereum types with the crown at soil level (roots below). Immediate planting required since top growth keeps on going. Plants will dehydrate if storage continues. Preferably the G.cinereum types should be grown indoors for up to 2 weeks.
- The G.sanguineum should only be covered with 1/2" of soil.
- All plants should be left alone for a couple of days (3-5) until you see some growth.
- Good drainage is important.

## GEUM

- Cold and wet situation should be avoided.
- Plant immediately upon arrival, apply fungicide and start indoors.
- Leave the plants alone after watering in until you see growth.

## GYPSOPHILA

- Plant the crowns at soil level (roots below).
- Apply fungicide and start indoors. Leave the plants alone for 3-5 days without additional water.
- Protect the crowns from extreme ventilation to avoid dehydration.

## HELIENIUM

- Apply fungicide and leave them to settle for a couple of days (3-5 days).
- Plants prefer full sun, but should be protected from direct sunlight the first 1-2 weeks.
- Plants can be cut back for more compact growth.

## HELIANTHUS

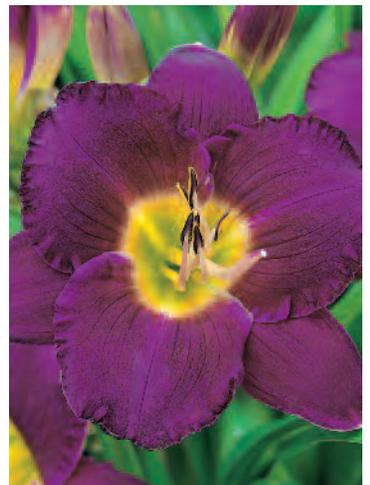
- Plant immediately.
- Crown at soil level (roots below)
- Start indoors and apply fungicide. Water in thoroughly. Do not add additional water until growth takes place.

## HELIOPSIS

- Plant immediately.
- Preferably an indoor start. Fungicide application and moderate watering.
- Plants prefer full sun, but protect from direct sun right after planting.

## HELLEBORUS

- Plant immediately.
- Crowns at soil level (roots below).
- Apply fungicide and water in well. No additional water for at least a week or until signs of growth.
- Start indoors with cool temperatures 40-45°F (5-8°C)
- Use a soil that is well drained with a pH that is around neutral (6.5-7.0)



## HEMEROCALLIS

- Trim roots to fit the desired pot. These plants can handle a lot.
- The smaller varieties such as H.Stella de' Oro, Mini Stella, Penny's Worth should not be exposed to wet and warm soils right after planting.

## HEUCHERA

- Almost no roots to cover, so be aware to not totally cover the plants or deep planting because they will rot.
- Moist soil and a cool base will give you nice foliage the entire year. Sun to partial shade.



### HOSTA

- Easy to grow in semi-shade to shade conditions.
- Prefers moist soils.
- #1 selling perennial.
- Trim roots to fit containers
- 1-2 eye divisions fill 1 or 2 gallon containers.

### HYPERICUM

- Plant in partial shade where the soil is moist retentive and well drained.
- Plants dislike wet feet, so avoid winter wetness.
- Plants can handle high humidity and heat quite well as long as the base is mulch in the higher zones.

### HYPOXIS

- Plant in sandy, well drained soils in full sun.

### IBERIS

- Plant in any garden soil that is well drained.
- Provide full sun.
- For good vegetative growth and maintenance of the plants they need to be cut back after flowering.
- Hardiness zone varies a lot within the species.

### INCARVILLEA

- Avoid cold and wet circumstances. Roots rot very easily when the soil isn't drained well.
- Plant the crowns slightly above soil level (1") or at soil level when 1 year old product is supplied. The material in our program are 2 year old #1 divisions.
- Avoid strong winds because the buds will dehydrate very quickly.

### IRIS

- Apply fungicide and water in thoroughly. Do not add water for the next couple of days (5-7) while the plants try to settle.
- For I.ensata use a humus soil that measures a pH around 6.0-6.5 and an EC value that does not exceed 1.0. After the plants start to grow, add fertilizer that will lower the pH since I.ensata prefers a pH around 5 or slightly below.
- Just remember that an Iris in a pot behaves totally different compared to its native habitat. So, when you try to lower a pH with inorganic fertilizers you have to monitor the EC very carefully.
- I.sibirica is much more forgiving regarding soil and pH, so here you simply have to watch that the roots do not sit in water very long before rooting the first week. Just apply fungicide and water. The following 2 weeks you should expose them to direct sunlight (all Iris roots, except the tubers)

### KIRENGESHOMA

- Avoid cold, wet circumstances. Good drainage!

### KNIPHOFIA

- Avoid cold, wet circumstances. Apply fungicide when watering in the roots. Leave the plants for 3-5 days. Protect the sprouting plants from direct sun light.
- During active growth you need to fertilize frequently.

### LAVATERA

- Plant immediately.
- Treat with a fungicide and water in thoroughly. Very slow to establish. Keep indoors until plants are starting to grow. (2-3 weeks).
- Avoid strong ventilation, buds dry out quickly.
- Warm potting soil and humid conditions should be avoided as well.

### LEWISIA

- Plant in the full sun.
- Use a well drained, sandy soil.
- Avoid wet winter circumstances.

### LIATRIS

- Easy plants.
- Do not plant too deep (up to 1" of soil)
- Avoid warm potting soil that is wet because they rot easily that way.
- Preventive spray against Pythium doesn't hurt.

### LIGULARIA

- Trim roots to fit container.
- Unfolding foliage should not be exposed to strong, direct sunlight during the first 2 weeks.
- Humus soil that is well drained.



### LILIUM

- Use a well-drained sterilized planting medium with a pH of 7.0.
- Before planting, dip bulbs in an appropriate fungicide to protect from root rot.
- Use standard size pots, planting the bulbs 4" deep in the pot.
- Keep moist at all times, but not wet.
- Grow in a high light intensity area with temperatures during the night not below 60°F (16°C) and a day temperature not above 78°F (26°C).
- Use a liquid fertilizer program once shoots have emerged at least 1".

### LINUM

- Plant in full sun with light sandy soils that are well drained.
- Avoid winter wetness.

### LYCHNIS

- Plants do best in full sun with moist retentive soil that is well drained.
- Zones vary within the species.

### LYSIMACHIA

- Plant ½" below soil level. Water thoroughly.



### MALVA

- Root pruning to fit the pots.
- Avoid cold and wet circumstances. Avoid direct sunlight when the first buds break.
- Plants unfold foliage before they can take water.

### MECONOPSIS

- Plant immediately.
- Water in with fungicide and start indoors 40-50°F (5-10°C). After you watered in the roots you need to leave the plants alone until the soil is totally dry. Do not water on top of the foliage because the plants will rot away in a day. Bottom or drip irrigation is required.
- Plants like it cool, so avoid warm and damp areas. Plants grow and take water, but root development is extremely slow.
- Humus soil and good drainage.

### MERTENSIA

- Plant ½" below soil level.
- Add fungicide and leave the plants alone for 3-5 days.
- Humus soil that is well drained. Water-logged plants will cause rotting. Starting these plants indoors is recommended.

### MYOSOTIS

- Prefers a moist retentive soil that is well drained.
- Shade to partial shade is best, but mulched plants do well in the sun as well in the northern climate.

### NEPETA

- Plant the crowns at soil level (roots below).
- Use fungicide and water in. After 3-4 days you'll see some growth already.
- First couple of days the plants are susceptible to excessive water, so we recommend to start the plants indoors.

### OMPHALODES

- Plant immediately!
- Crowns at soil level (roots below). Fungicide and plenty of water for good contact between roots and soil.
- No additional water the first 3-5 days.
- Indoors for up to 2 weeks. Avoid warm potting soil.
- Humus soil and good drainage.

### PACHYSANDRA

- Great groundcover plants for the shade.
- Plant in well drained moist retentive soil.

### PAEONIA

- Do not plant too deep. Cover the eyes with up to ½" of soil.
- Water in the roots thoroughly. Humus soil and good drainage.
- The pH should be between 5.5-6.5.
- Need to be fed well during the season.
- Spray against Botrytis regularly.

### PAPAVER

- Do not plant the root(s) too deep. Crown at soil level (root(s) below).
- Many times the plants are sprouting already in the Spring therefore you need to water in these roots with a fungicide. These plants can start to grow from their reserve, so you do not need to water for at least a week. When you plant later in the spring you need to watch out for dehydrating plants.
- Does not like hot and humid conditions, so try to keep the base of the plants cool and they will hold their green foliage longer.

### PENSTEMON

- Water in with fungicide. Avoid cold and wet circumstances.
- Avoid standing water. Good drainage.
- Hot and humid areas are not preferable.

### PEROVSKIA

- Plant immediately.
- Soak the pots when you water in the roots. Apply fungicide as well.
- Do not continue with excessive watering the next 2 weeks. Very slow root development.
- When the buds start to break you need to avoid direct sunlight since plants hardly have roots yet to support growth.
- You can trim the plants back for more compact growing.

### PERSICARIA

- Cover the roots with ½" of soil. Water in and stay away for 3-5 days.
- Well drained soil

### PHLOMIS

- Crowns at soil level (roots below). Water in with fungicide and wait 3-5 days before you start a regular water schedule.
- Good drainage and sandy soil.



### PHLOX

- Cover roots with ½" of soil.
- Water in well with a fungicide. Phlox likes to be started as dry as possible, so do not fit this plant in the water schedule for at least 5-7 days. Needs to be started indoors for up to 2 weeks for best results.
- Can be trimmed down for more vegetative growth or shorter display.
- During active growth the plants need constant care. If the plants wilt, mildew will develop immediately. Try to space the crop for optimum ventilation. No overhead watering.
- Water early in the morning, so that the crop can dry during the day.

### PHYSOSTEGIA

- Crowns at soil level (roots below).
- Water in thoroughly and add fungicide. After 3-5 days you'll see the plant responding and regular watering can take place.
- During active growth the plants like a constant moist soil.

### PLATYCODON

- Plant the crowns at soil level (root(s) below).
- Apply fungicide and water in well. Plants have enough reserve to start by themselves, so stay away with water for 5-7 days. For later season plantings, you will need to monitor moisture more carefully.
- It would be better to start them indoors and leave them there for 2 weeks.
- Protect the eyes from strong winds since they dry out very quickly

### POLEMONIUM

- We only sell established plants in 3" pots.

### POLYGONATUM

- Do not plant too deep and do not let them sit in moist soil. Add fungicide, water in and leave alone for 5-7 days.
- Good drainage and humus soil.
- Do not start with a low pH even though they can handle it during active growth.



### POTENTILLA

- Plant the crowns at soil level (roots below).
- Any soil that is well drained.
- Water well and let them settle for 3-5 days.

### PULMONARIA

- Plant immediately.
- Keep the crowns at soil level (roots below).
- Use fungicide and water in thoroughly. Let them settle for the first 3-5 days.
- They are susceptible to rot when they are exposed to lots of water, so it would be better to start indoors for up to 2 weeks.
- Humus soil and good drainage.

### PULSATILLA

- Plant immediately.
- Start indoors. Plant the crowns at soil level.
- Use fungicide and plenty of water to water in only.
- No water the first 3-5 days.
- Humus soil and good drainage. Avoid warm potting soil and high humidity.
- Plants are drought tolerant in cooler areas. In hot areas mulch is needed to keep the base of the plants cool.

### RATIBIDA

- Plant in any soil that is well drained.
- Provide full sun.
- Avoid winter wetness.
- Keep the base of the plants cool in the more southern climates.

### RHEUM

- Humus soil and good drainage.
- Plants do not like heat and humidity, so you need to keep the base cool in zones 7-8.
- During active growth keep the soil moist continuously and feed them as well.

### RODGERSIA

- Humus soil and good drainage. Continuous moist and partial shade.
- Do not start in warm potting soil (Pythium thread).

### ROSMARINUS

- Prefers full sun and any well drained soil.
- Avoid winter wetness

### RUDBECKIA

- Plant immediately.
- Plant the crowns at soil level.
- Water in thoroughly with fungicide. Do not water regularly for 3-5 days because they need to tress down.
- Avoid warm potting soil, low pH and high salt levels.
- Late Spring plantings should be protected from direct sunlight up to 2 weeks.

### SALVIA

- Keep the growing tips at soil level.
- Treat with a fungicide and water in well.
- Plants rot very easily under wet circumstances. Good drainage is important.
- If you protect the plants from the elements by keeping them indoors during the first week of growing, you would have a much higher success ratio compared to an outdoor start.
- Avoid warm potting soil.

### SANGUISORBA

- Water in well and give them a couple of days to get used to the growing conditions.
- Well drained and moisture retentive soil.

### SAPONARIA

- Plants can handle drought very well, so watering in is enough to get them started.
- Too much water in the beginning will cause them to rot.
- Sandy soil preference.



### SEDUM

- Crowns at soil level.
- Plants handle drought very well, but give plenty of water to start them.
- Sandy soil preference. Good drainage.
- Too much water will cause the plants to rot.
- Remove dead woody parts for Phoma threat.
- Hot & humid areas can cause foliar Botrytis.

### SEMPERVIVUM

- Full sun and extremely well-drained sandy soil. Avoid winter wetness.



### SIDALCEA

- Plant immediately with crowns at soil level.
- Avoid cold and wet conditions.
- Apply fungicide and water in well. Do not water for 3-5 days.
- Plants do best in cooler climates with well drained soil.

### SISYRINCHIUM

- Plant in partial shade to full sun in any well drained soil.
- Avoid Winter wetness.

### SOLIDAGO

- Plant in well drained moist retentive soil.
- Place in the full sun. Extreme elongation if placed in the shade.
- Plants are susceptible to rust and mildew. Good ventilation/spacing of the plants will reduce the problem.

### STACHYS

- Water in thoroughly with a fungicide. No additional water needed for 3-5 days.
- Preferably indoor start until growth develops.
- Good drainage is essential. Sitting water will cause rotting roots.
- Avoid warm/wet potting soil. Pythium threat.

### STOKESIA

- Make sure the roots have good contact with the soil. Water in extremely well and leave them for 3-5 days. Avoid air pockets.
- After the plants are growing they like a continuous moist surrounding.

### TANACETUM

- Plants do best in the full sun in sandy, well drained soil.
- Avoid winter wetness.
- In the more southern zones the plants either prefer mulching or some afternoon shade.

### THALICTRUM

- Plants are late to show leaves in spring.
- Likes part shade and moist soils.
- Tough vigorous plant.

### THYMUS

- Plant in full sun and in any soil that is extremely well drained.
- These plants hate wet feet.
- High humidity areas will cause these plants to melt.

### TIARELLA

- Plants do best in shade to partial shade.
- Tolerant to moist soils which are well amended with organic matter and well drained.
- In southern climates you might want to mulch the plants.
- Plants do not tolerate drought!

### TRADESCANTIA

- Easy plants, but watch out for hot & humid moments especially right after planting.
  - Established plants should be kept cool at the base for best results.
  - Look for the newer varieties because foliage holds better in heat and humid areas.
- ### TRICYRTIS
- Plant the crowns slightly below soil level (¼"). Water in well with a fungicide. Leave them alone for 5-7 days because they rot very easy in wet circumstances.
  - Avoid warm/wet potting soil, low pH and high EC.
  - If possible, start indoors.
  - After they are starting they can handle lower pH values, but EC should stay around 1.0.
  - Well drained humus soil has the preference.

### TROLLIUS

- Water in well with fungicide and start indoors 40-50°F (5-10°C). After 3-5 days you'll see some sprouting.
- Avoid standing water and warm potting soil in this stage because they are susceptible to wilting.
- Humus soil and good drainage.

### VERBASCUM

- Plant immediately.
- Start indoors and add fungicide to the water. Water in extremely well, so they'll have enough to get started. Plant crowns at soil level.
- You can easily leave the plants for 5-7 days without water. When they are not established you have to watch out for excessive water on the crowns because they rot from the center down.

### VERNONIA

- Firm planting, good contact with the soil through watering in. Pause the next water schedule for 3-5 days.

### VERONICA

- Usage of fungicide is recommended right after planting.
- Plant shoots/crowns at soil level. Too deep planting will result in rotting plants.
- Hot and humid areas will cause the plants to suffer, so you need to keep the base cool.
- You can trim the plants down for more vegetative growth.

### VIOLA

- One ship date item indicates that they do not hold in storage very well.
- Plant upon arrival. Plants must be carefully monitored the first few days. Do not over water and grow in a cool location.
- It is essential to apply a fungicide when plants are started as well as in the early stages of growth.
- Avoid warm/wet soil.

### WEIGELA

- Soak the roots for several minutes including a fungicide.
- Plant firm and soak again for good contact.
- Leave the plants for a while because shrubs do not start quickly from bare root.

### YUCCA

- Avoid cold and wet circumstances.
- Cover the roots with 1" of soil and water in well. Protect the roots from standing water.
- Good drainage is very important.



To reach the ultimate growing plant or optimum end result you might run into some obstacles during the season. Some typical problems can be easily detected and taken care of, such as the following insects pests and fungal diseases.

## Common Insects Pests

### Aphid

- A minute bug that feeds by sucking sap from plants. It reproduces rapidly, often producing live young without mating, and may live in large colonies that cause extensive damage to crops.
- Biological Control: Aphidoletes aphidimyza, Chrysoperla carnea, Aphidius colemani and Lady beetles.
- Biological Control Compatible Insecticides: BotaniGard, Endeavor and Enstar II.
- Other Insecticides: Orthene, Marathon, Thiodan, Mesuro, Ornazin 3% and Horticultural Oil.

### Black Vine Weevil

- A small beetle with an elongated snout, the larvae of which typically develop inside seeds, stems or other plant parts.
- Biological Control: Steinernema spp. and Heterorhabditis spp.
- Biological Control Compatible Insecticides: BotaniGard,
- Other Insecticides: Orthene, Marathon, Thiodan, Mesuro, Ornazin 3% and Horticultural Oil.

### Caterpillars

- Caterpillars are soft, segmented larvae of a moth or butterfly with distinct, harder head capsule, six legs up front and false fleshy legs on rear segments. They usually attack the leaves, stems, or roots of the plant.
- Biological Control Compatible Insecticides: DiPel, BotaniGard and Conserve.
- Other Insecticides: Orthene, Talstar and Decathlon.

### Fungus Gnats & Shorefly Adults

- Fungus Gnats are slender and delicate flies whose larvae feed chiefly on fungi. The shorefly adult resembles a small house fly (It is about the size of a fruit fly), the antennae are short, and the head is relatively large with red eyes. In addition, shore flies have small whitish spots on their wings.
- Biological Control Compatible Insecticides: Conserve.
- Other Insecticides: Orthene, Marathon, Thiodan, Mesuro, Orthene, Talstar and Decathlon

### Leaf Hoppers

- Leaf Hoppers are one of the largest families of plant-feeding insects. Leaf Hoppers feed by sucking the sap of vascular plants, and are found almost anywhere such plants occur, from tropical rain forests, to arctic tundra.
- Insecticides: Orthene and Thiodan.

### Leafminers

- Any insect which lays its eggs in the spongy layer between the upper and lower surfaces of leaves. Larvae develop between the leaf surfaces and tunnel or 'mine' out the spongy middle layer as they grow, giving leaves a spotty and brownish appearance.
- Biological Control: Diglyphus isaea and Hypoaspis miles.
- Biological Control Compatible Insecticides: Adept, Distance and Citation.
- Other Insecticides: Orthene, Marathon, Avid, Pedestal and Ornazin 3%.

### Mites

- A minute arachnid that has four pairs of legs when an adult, related to ticks.
- Biological Control: Pyoseiulus persimilis and Amblyseius californicus.
- Biological Control Compatible Insecticides: Tetrasan, Floramite, Pylon, Ovation and HexygonSluggo.
- Other Insecticides: Sanmite and Avid.

### Root Aphids

- The root aphid, as the name implies, is restricted to the roots; generally, the aphid is associated with fibrous roots rather than the main storage root. Winged aphids may occasionally be seen in woolly wax masses in the crown as they crawl up from the roots to fly to new hosts. Wingless forms found on roots are yellowish in color and secrete a dull, white waxy substance, giving the root a mealy appearance.
- Insecticides: Orthene drench.

### Slugs & Snails

- Slug and snails are mollusks with soft muscular bodies that secrete slime. They usually do their damage at night mainly attacking the leaves of the plant.
- Biological Control Compatible Insecticides: Sluggo.
- Other Insecticides: Mesuro, Mersuro Por Pellets and Deadline Pellets.

### Thrips

- A minute black winged insect that sucks sap and can be serious pests of ornamental and food plants when present in large numbers.
- Biological Control: Amblyseius cucumeris and Orius spp.
- Biological Control Compatible Insecticides: Conserve, BotaniGard and Enstar II.
- Other Insecticides: Orthene, Mesuro, Decathlon, Hiodan, Avid, Ornazin 3%, Horticultural Oil and Pedestal

### White Fly

- Whiteflies feed on plant juices using piercing-sucking mouthparts, causing stunted growth, leaf yellowing, and reduced yields. They are able to reproduce quickly and spread rapidly, and are considered a major economic pest of greenhouse crops. Whiteflies have a wide host range and thrive on hundreds of ornamental plants.
- Biological Control: Encarsia formosa and Eretmocerus eremicus.
- Biological Control Compatible Insecticides: BotaniGard, Distance, Endeavor and Enstar II
- Other Insecticides: Orthene, Decathlon, Marathon, Thiodan, Ornazin 3%, Pedestal and Horticultural Oil.

### IMPORTANT:

Prior to the use of any pesticides you should make sure it is legal and approved for use in your area.

## Fungile Diseases

### Botrytis

- Grayish, woolly fungi on plant tissue.
- Cultural measurements such as ventilation, no watering overhead(Phlox, Peony) and spacing of the crop.
- Iprodion and TMTD can be used again, but here rotation with other fungicides is important to avoid resistance.

### Fusarium

- Crowns, eyes are blackish colored. Foliage turns yellow and holds the mold (brownish/pink).
- Rootbase and stem show dark brown coloration that eventually rots away.
- Infected plants show reduced growth and will die eventually if not taken care of.
- Precautionary measures are disinfecting pots, potting tables, knives, crates etc.
- We use TMTD(Thiram), but Iprodion or Captan can be used as well.

### Mildew

- Found on the leaves, branches and flowers.
- White powdery substance occurs on the surface of older leaves and spreads slowly.
- Important detail is to maintain cell tension(to keep growing). Mildew usually occurs when plants slow down by lack of water, not enough ventilation, not enough spacing or watering overhead.
- Combine systemic and non systemic fungicides, but make sure to alternate and avoid starting with the same all the time.
- Starting young plants, systemic fungicides should be avoided.
- False mildew causes grayish to purplish irregular spots on top of the leaves, beneath the foliage you'll find a brownish substance that will be surrounded by a purple edging.

### Nematodes

- Cause severe plant tissue deformity throughout the plants. Eventually the infected parts die back.
- It can be treated, but quite heavy pesticides need to be used, so it is better to destroy infected plants.
- Important guidelines are to start with healthy plants with no symptoms.

### Phoma

- Sprouting and elongating eyes, buds or tips dehydrate and die. The brown and or black spotted leaves fall very early.
- Spray with fungicide (Maneb, Daconil) when you see the symptoms.

### Phytophthora (root-rot)

- Clear distinction between healthy and sick tissue. Light colored leaves that eventually dry out.
- Wilting plants followed by dead plants.
- Avoid damaging the base of the plant. Preventive spray with Aliette.

### Pythium (root rot)

- Bad root system and rotted roots. The epidermal tissue is often rotted off entirely from the roots. The core of the roots are intact, but cause major problems since these roots won't take water and usually rot away as well.
- Good drainage is of key importance. Hot temperatures in pots with too much water is far from ideal because weakened plants will be infected.
- Use Aliette or Fongarid.

### Rhizoctonia

- Easy to recognize because the stem starts to rot away at soil level. Stems and foliage are covered with a light brown fungi layer.
- Keep the top layer of the soil dry, so the fungi can't spread. Keep foliage dry as well. Spacing between pots is important. Do not let the pots heat up in moist circumstances because the disease reproduces extremely quickly.
- Iprodion, TMTD and Rizolex are effective.

### Sclerotinia

- Small blackish particles that resemble mouse droppings. Can be found in the leaf axils or died back stems from dormant plants. This fungi over winters and becomes active late Spring.
- Early Spring shipments usually don't have any difficulties because this fairly weak fungi can't take on healthy plant tissue. Late Spring shipments need to be treated with fungicide because dead tissue is almost immediately covered with a white wooly substance.
- Spacing plants and avoid over watering are some regulations. In Holland Switch is a commonly known fungicide.

### Verticillium

- Tough fungi that either enters the plant through roots or during cutting, pruning etc.
- Infected plants suddenly start to wilt especially the younger parts. Typical is that the pattern shows on one side of the plant or branch first and eventually takes over the entire plant.
- In the lower parts of the plant (branches) you can find a purplish color after pruning infected plants.
- Strong growing, healthy plants are usually not showing any symptoms, but young material especially cuttings or weakened plants are lost because you can't treat with chemicals.
- Cultural measurements are needed, clean material, good drainage. Important is to destroy infected material.

# Overwintering Methods

*Caring for your potted perennials over the winter!*

## IN A GREENHOUSE OR POLYHOUSE AT LOW TEMPERATURES

This method is the best for temperature control especially if minimal heat is used. It is an ideal method to control moisture, growth, and heat build-up. Remember to provide good air circulation with the use of fans.

## IN UNHEATED POLYHOUSE UNDER A FOAM BLANKET

Place containers inside a hoop house covered with white poly. Foam blankets are then placed over the containers. The blankets should not be weighted down so that air circulation is provided under the blanket. Evergreens should be treated as mentioned in method 1 listed above.

## THERMOBLANKET TECHNIQUE

This insulated foam blanket is placed over the containers during the coldest months of the year. Cover the blanket with white reflective nursery poly film, preferably 4 mill one-year white poly. Pull plastic tight and secure edges about 12 inches beyond the outside pots with concrete blocks. Foliage should be cut back to the crown with the exception of evergreens. Evergreens should be laid on their sides to keep the foam from crushing the foliage and causing rot.

## SANDWICH METHOD

This method is done by placing clear or white plastic directly over the plants and then covered with a 12 inch layer of straw or salt hay and then a layer of white plastic. Evergreens should be treated as mentioned in the Thermoblanket Technique listed above.



*Heliopsis*



*Brunnera*

# Additional Information

## PLANT HEALTH

The most important factor for overwintering is to have healthy, well rooted plants. Non-established plants overwinter poorly. So too, with plants that are pot bound, or more specifically, plants whose dormant eyes are crowded.

## RODENTS

Mice and other rodents can cause severe damage during the winter months chewing on pot, plants and anything else in their way. About a month before covering your plants, start baiting to reduce populations. Place traps every 15-20 feet using plastic bait boxes. These traps can stay under the cover throughout the winter.

## WHEN TO COVER AND UNCOVER

Covering plants too soon will cause a heat build-up and damage the plants. Removing the cover too late will cause plants to put on a soft flush of growth. You will have to monitor the weather closely when covering and uncovering. When fall night temperatures are forecasted to be below 25°F (4°C) you should cover, and when night temperatures in spring are just above 32°F (0°C) you should uncover.



*Phlox*



*Agapanthus*

# General Soil Information

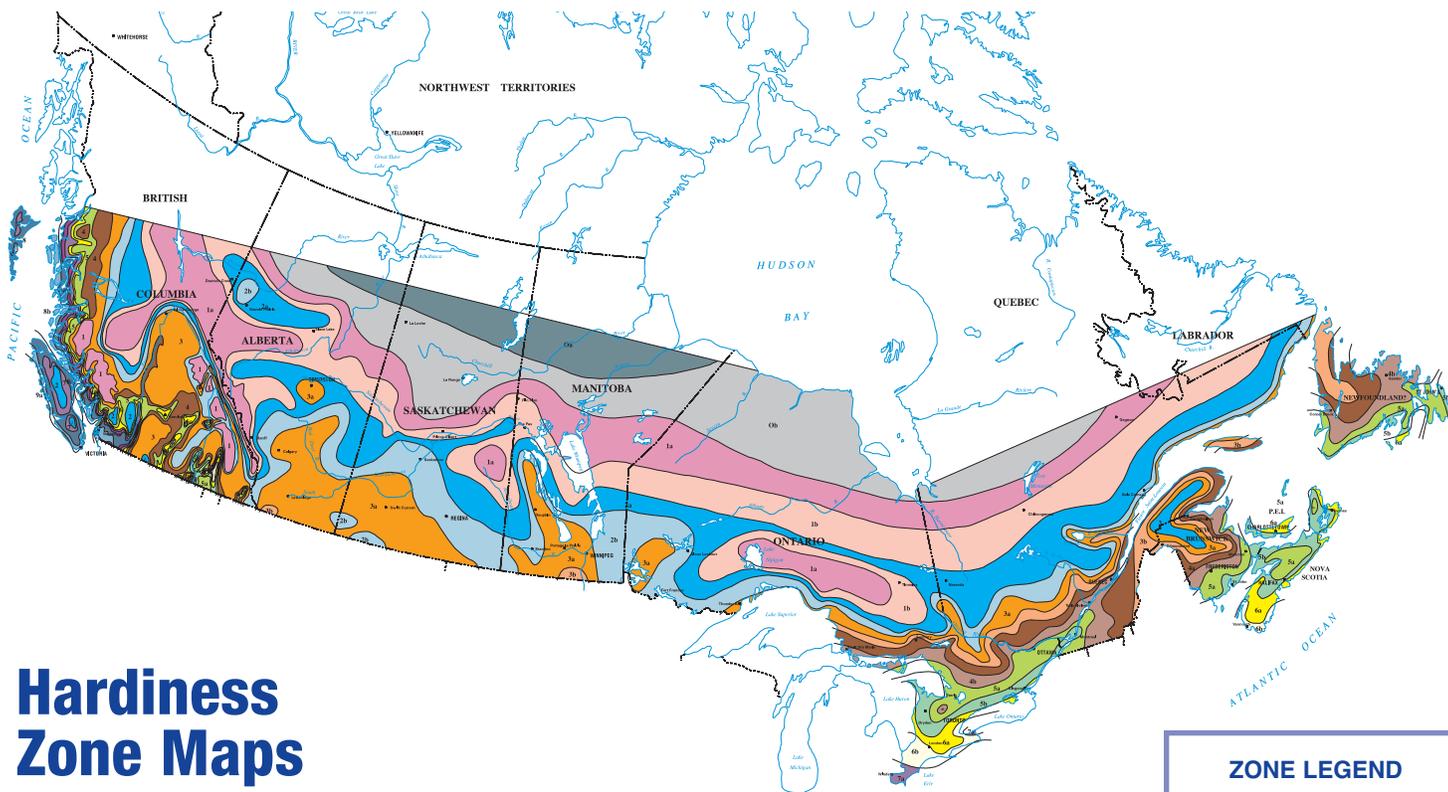
Your general potting soil for perennials and bulbs should have a pH range of 5.3 to 6.3.

A low soil pH can cause an excess of micro nutrients such as Manganese (Mn), Iron (Fe), Boron (B), Zinc (Zn), Sodium (Na), Copper (Cu), and Ammonium (NH<sub>4</sub>) or a deficit of Calcium (Ca), Phosphorus (P), Sulfur (S), Magnesium (Mg), Potassium (K), and Molybdenum (Mo). While a high soil pH can cause an excess of micro nutrients: Ammonium (NH<sub>4</sub>), and Calcium (Ca), or a deficit of Boron (B), Copper (Cu), Magnesium (Mg), Iron (Fe), Manganese (Mn), Zinc (Zn), and Phosphorus (P).

It is very important to regularly check your soil mix during active plant growth, because EC and pH levels can change. Also the use of certain fertilizers, groundwater, and other water solubles can cause a change in the soil pH.

For early root development the correct pH is very important. If your pH is not correct you will immediately notice a change in foliage coloration with brown edges and an extremely slow growth rate.





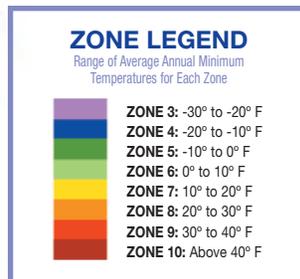
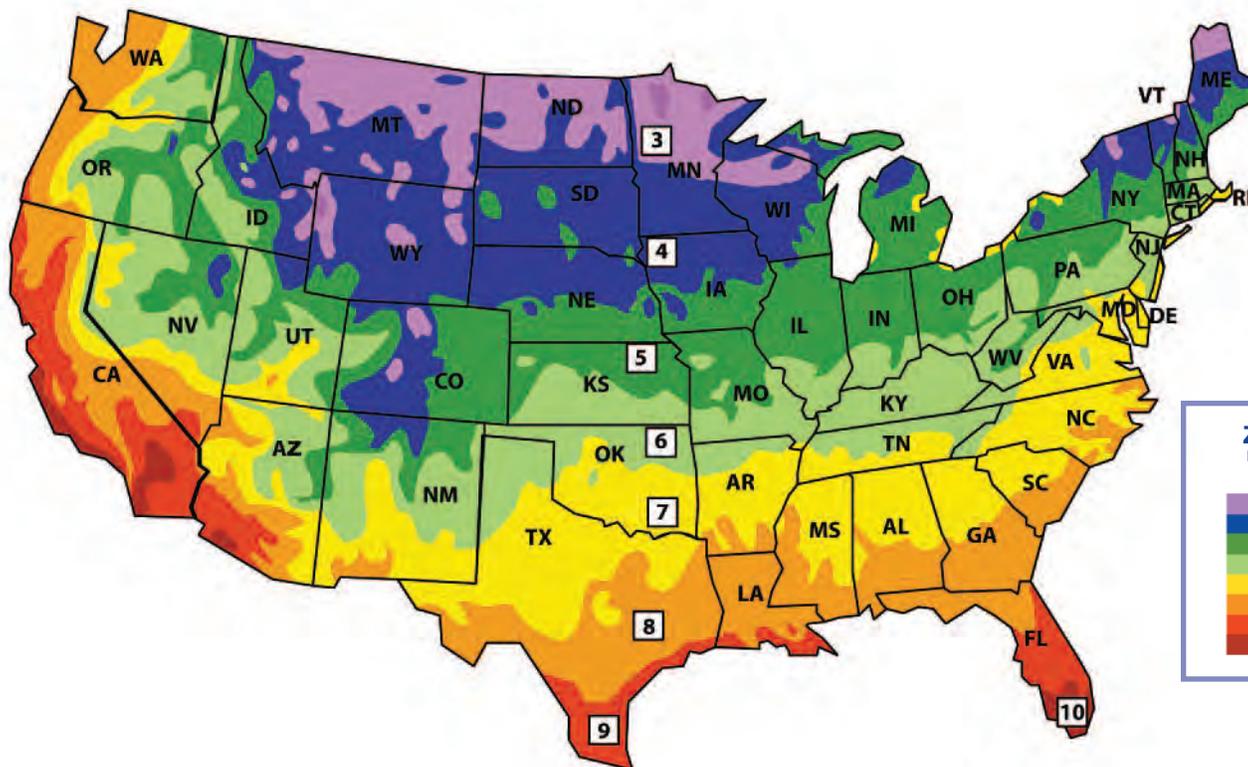
# Hardiness Zone Maps

## Using Your Hardiness Zone Maps

We want you to get the best results from what you select. That is why we have provided this Hardiness Zone Map. The Hardiness Zones are based on the average minimum temperatures for each zone. Many factors such as sun, wind, snow cover or rainfall in your microclimate can also affect the minimum temperatures in your area as presented by this map.

Once you have determined the zone you live in you can use the chart as well as the zone listings in each of our product descriptions to determine which varieties are best for your garden. Keep in mind that the lower number indicates the most northerly area where plants will survive the winter, and the higher number is the most southerly area where they will perform consistently. For instance, if the description gives a range of zones 4-7, it

means that the plant will perform well and winter over in zones 4, 5, 6 and 7. Many of our varieties do grow well outside the zone recommended. However in the northern areas, some varieties may have to be lifted and stored and in the south, some varieties may have to be planted in shaded cooler areas.





*Rudbeckia*



*Alocasia*



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