

## Cultural Instructions for a good start

### 1. Upon arrival

**Let the roots thaw out *slowly*.**

Most plants are shipped frozen at 28°F (-2°C) to keep them dormant. If the plant material is still frozen upon arrival please leave it in a cool, dry place to thaw out slowly so that it is able to adapt.

**Plants need fresh air: open all boxes and bags immediately upon receipt, but prevent dehydration**

Temperature and condensation will build up inside closed boxes, causing sprouting and rotting. However, plant material in open boxes can dry out easily, so ventilation should be minimal and prevent direct sunlight at all times.

**Check the condition of the roots in the boxes daily.**

Plants that have started to sprout must be planted immediately. If any sign of fungal or bacterial infection is suspected, plants can not be stored anymore. Infected parts must be removed and the plants treated with fungicide and/or bactericide.

**Items that do not tolerate storage must be planted immediately.**

Do not leave the plant material longer than necessary in the boxes and bags, for storage will reduce vigor for every species. If unable to transplant immediately, store in a cool place (2-8°C/36-46°F). When stored at higher temperatures with lower humidity, the vigor will be reduced dramatically. At temperatures higher than 68°F (20°C), the roots must be planted within 24 hours.

### 2. Planting

**Do not plant roots that are still frozen.**

Frozen roots are not able to transport water to the buds. If the buds have thawed out before the roots have, they can be damaged by dehydration. Do not force thawing as this will create stressful conditions to the roots and buds.

**Handle the roots with great care to avoid breaking of buds and/or roots.**

Some species have fragile buds and/or roots. Breaking off may decrease plant size.

**Don't let roots dry out during potting.**

Prevent dehydration of the roots by planting them right away after you have taken them out of the box. Serious damage to fine-haired roots like Epimedium or Phlox can be done in 10 minutes, they can dry out in 20 minutes !. Make sure the potting room is free of draught. Always cover roots during breaks.

**Rootpinching**

Some plants root better if the roots are pinched (see table)

**Soil**

It is necessary to use a well-drained potting soil to avoid roots staying wet, which can cause them to rot. Many problems come from a lack of adequate drainage. Don't give plants fertilizer before they are actively growing.

**Firm the soil around the roots: prevent air pockets**

Roots should be centered in the pot and spread out evenly, with all roots facing downward. There must be good contact between all parts of the roots and the soil. Firm the soil around the roots. All of this is necessary for the roots to absorb water and nutrients.

**Many perennials should be planted "high"**

Results of experiments conducted by Dr. Bill Miller of the Cornell University suggest that many perennials should be planted with the crown (intersection of the roots and the shoots) at or slightly **above** soil level, after watering and settling. Some plants such as Geranium Ballerina showed an almost absolute aversion to deep planting (1/2 to 1" deep) with a nearly 100% loss. High planting, on the other hand, resulted in nearly 100% survival and good growth (Handling Bareroot Perennials, Growertalks, May 2004, by W.B. Miller and A. Bestic).

The most important reason for this, is that plants will receive daylight sooner than when they are planted too deeply. With daylight, plants make energy, which they need for growing. Also, when planted too deeply the crown may stay too wet for too long, which can cause them to rot.

### 3. After planting

#### Water carefully.

After planting in early spring, do not water the first week: in this stage the roots can only accept little moisture and need to be stimulated to look for water. After this, slowly start with watering.

Also, the young shoots are especially vulnerable to overwatering before they appear above the soil: in this critical phase, over watering may cause suffocation of plant parts or damping-off diseases. Be extra careful with irrigation at low temperatures: plant growth is slower, therefore this critical phase lasts longer. Some plants need a dryer start than others. Once the plants have started to grow, revert to a **regular** watering schedule. Some plants prefer to be grown "dry", others "wet" (see table). Keep the soil moisture as constant as possible; too much fluctuation will harm the plant.

#### Fungicide drench

A fungicide drench applied on plant material one to two weeks after planting can prevent problems.

#### Greenhouse conditions

In early spring, plants have different requirements regarding temperature. Some plants prefer a cold start (35 - 55 F.), some a medium cold start (45 - 65 F.), others a warm start (60 - 75 F). Prevent the young shoots from freezing at all times: some plants won't give you a second chance !.

Ventilation in the greenhouse is very important: little ventilation will cause problems with mildew and fungus.

## Claims and Comments

Upon arrival, please check the plants you have received against the packing list and report shortages.

Also, notify us immediately if you doubt the viability of a variety during planting: e.g. when roots are moldy or soft.

We recommend that you still plant the stock because many plants will grow out of it. Never send stock back without letting us know first.

**Please inform us WITHIN 14 DAYS if you discover any problems:**

**Pre-notification within 14 days is necessary for credit allowance at a later date**

**No credit allowance after June 1, 2006**

#### **Incorrect varieties can be reported till June 1, 2006**

Although we do our best to ensure all our stock is true to name, mistakes can occur occasionally. Therefore, you have until November 1, 2005 to report these mistakes. Photographic proof may be requested or your account manager may come to visit you.

#### **Warranty**

Orders are subject to crop conditions and other causes beyond our control. Orders are accepted subject to availability and we reserve the right to cancel a portion or all of your order if plants are not available due to causes beyond our control. We guarantee our nursery stock to be true to name. We make no other express or implied warranty and the plants are sold only with the limited guarantee. We will not be liable for any direct, indirect, special or consequential damages or lost profits, or business interruption. We shall in no case be liable for any sum greater than the amount originally received for said nursery stock.

**Email: [Info@darwinplants.com](mailto:Info@darwinplants.com)**

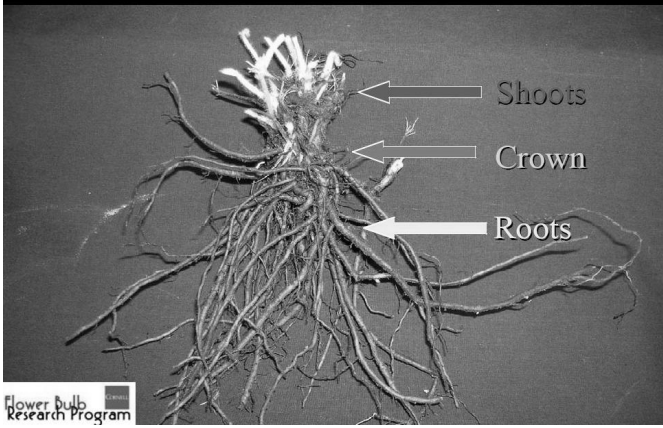
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Pictures opposite page:  
by Dr Bill Miller, Cornell University

*Anemone 'Honorine Jobert' crown*



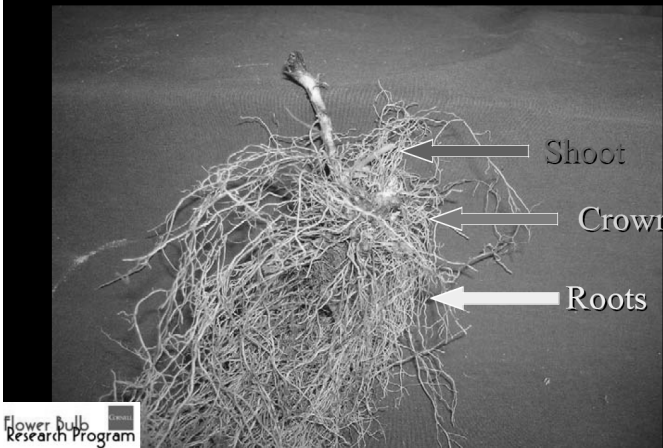
Flower Bulb Research Program

*Anemone 'Honorine Jobert' "planted high"*



Flower Bulb Research Program

*Epimedium sulphureum crown*



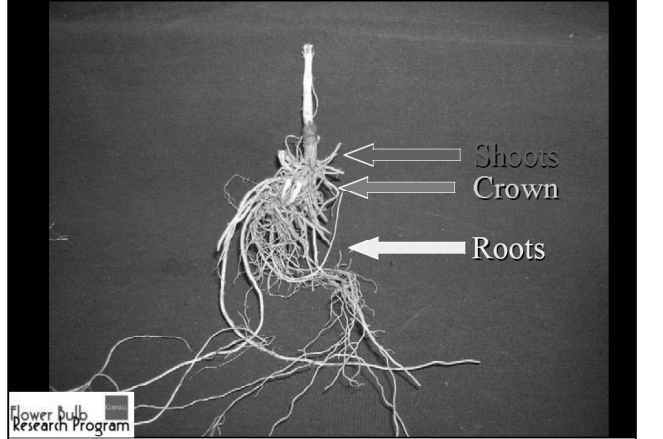
Flower Bulb Research Program

*Epimedium sulphureum "planted high"*



Flower Bulb Research Program

*Phlox paniculata 'Laura' crown*



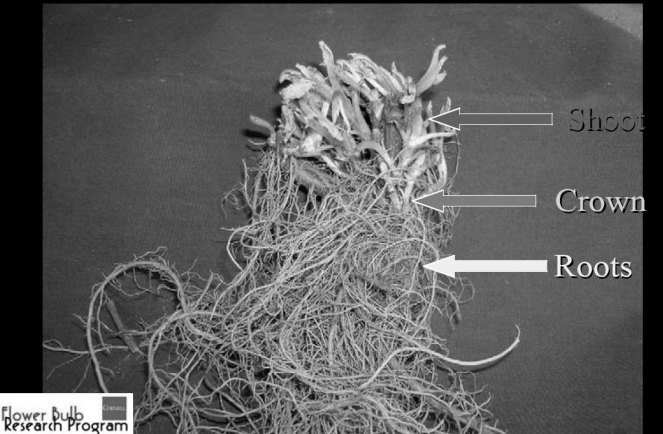
Flower Bulb Research Program

*Phlox paniculata 'Laura' "planted high"*



Flower Bulb Research Program

*Salvia nemorosa 'Carradonna' crown*



Flower Bulb Research Program

*Salvia nemorosa 'Carradonna' "planted high"*



Flower Bulb Research Program

genus	P	Planting Depth	Start	Grow
Acanthus		crown at soil level.	35-55 F.	dry
Achillea	Y	just below soil level	35-55 F.	dry
Aconitum	Y	just below soil level	35-55 F.	
Agapanthus	Y	just below soil level	60-75 F.	
Agastache	Y	crown at soil level.	35-55 F.	
Ajuga		crown at soil level.	35-55 F.	
Alcea	Y	crown at soil level.	45-65 F.	
Alchemilla		just below soil level	35-55 F.	
Alstroemeria		just below soil level	60-75 F.	
Anchusa	Y	crown at soil level.	35-55 F.	
Anemone	Y	just below soil level	35-55 F.	
Anthemis		crown at soil level.	35-55 F.	
Aquilegia	Y	just below soil level	35-55 F.	
Arrhenather		crown at soil level.	45-65 F.	
Aruncus		just below soil level	35-55 F.	wet
Asclepias	Y	crown at soil level.	60-75 F.	dry
Aster	Y	just below soil level	35-55 F.	dry
Astilbe		crown at soil level.	35-55 F.	wet
Astrantia		crown at soil level.	35-55 F.	wet
Athyrium	Y	crown at soil level.	35-55 F.	
Bergenia		crown at soil level.	35-55 F.	wet
Brunnera	Y	crown at soil level.	35-55 F.	
Buddleia		crown at soil level.	45-65 F.	
Calamagrostis		crown at soil level.	45-65 F.	
Campanula	Y	just below soil level	35-55 F.	
Canna		crown at soil level.	60-75 F.	wet
Carex		crown at soil level.	45-65 F.	
Caryopteris		crown at soil level.	45-65 F.	
Centaurea	Y	crown at soil level.	35-55 F.	dry
Chelone	Y	just below soil level	35-55 F.	wet
Chelonopsis		just below soil level	35-55 F.	
Cimicifuga		just below soil level	35-55 F.	wet
Clematis	Y	just below soil level	35-55 F.	
Clerodendrum		crown at soil level.	60-75 F.	
Convallaria		crown at soil level.	35-55 F.	
Coreopsis	Y	crown at soil level.	35-55 F.	dry
Cosmos		just below soil level	60-75 F.	
Cotinus		crown at soil level.	35-55 F.	
Crocasmia		2 -3" below soil	45-65 F.	
Cypripedium		eyes at soil level	60-75 F.	
Dahlia		eyes at soil level	60-75 F.	
Darmera	Y	just below soil level	35-55 F.	
Delphinium	Y	just below soil level	45-65 F.	
Dianthus		just below soil level	45-65 F.	
Dicentra	Y	crown at soil level.	35-55 F.	
Dodecatheon		eyes at soil level	60-75 F.	wet
Dryopteris		eyes at soil level	45-65 F.	

genus	P	Planting Depth	Start	Grow
Echinacea	Y	crown at soil level.	45-65	
Echinops		crown at soil level.	45-65	dry
Epimedium	Y	crown at soil level.	45-65	wet
Eremurus	Y	Crown just above	60-75	
Erodium		eyes at soil level	60-75	
Eryngium	Y	just below soil level	60-75	dry
Eupatorium		just below soil level	35-55	wet
Euphorbia	Y	crown at soil level.	60-75	dry
Festuca		crown at soil level.	45-65	
Filipendula		crown at soil level.	35-55	wet
Gaillardia		crown at soil level.	45-65	
Gaura		just below soil level	45-65	dry
Gentiana	Y	eyes at soil level	45-65	
Geranium	Y	Crown at soil level	35-55	
Geum		crown at soil level.	35-55	dry
Gillenia	Y	crown at soil level.	35-55	
Helenium	Y	crown at soil level.	35-55	
Helianthus	Y	crown at soil level.	35-55	
Heliopsis	Y	just below soil level	35-55	dry
Helleborus	Y	crown at soil level.	35-55	
Hemerocallis		crown at soil level.	35-55	
Hepatica		eyes at soil level	45-65	
Heuchera	Y	crown at soil level.	35-55	
Heucherella	Y	crown at soil level.	35-55	
Hosta		crown at soil level.	35-55	
Hydrangea		crown at soil level.	35-55	
Imperata		crown at soil level.	45-65	
Incarvillea		crown at soil level.	60-75	
Iris		Crown at soil level.	35-55	wet
Kalimeris	Y	crown at soil level.	35-55	
Kirengeshoma		just below soil level	35-55	
Kniphofia	Y	crown at soil level.	45-65	dry
Lavatera	Y	just below soil level	35-55	
Leucanthemum	Y	just below soil level	35-55	
Liatris		3 -4" below soil	35-55	
Ligularia		crown at soil level.	35-55	wet
Lilium		4" below soil level	35-55	
Lobelia	Y	crown at soil level.	35-55	wet
Lychnis	Y	crown at soil level.	35-55	
Lysimachia		crown at soil level.	35-55	wet
Malva	Y	crown at soil level.	45-65	dry
Meconopsis	Y	eyes at soil level	35-55	wet
Mertensia	Y	crown at soil level.	35-55	wet
Miscanthus		crown at soil level.	45-65	
Molinia		crown at soil level.	45-65	
Monarda	Y	eyes at soil level	35-55	
Muosotis		eyes at soil level	45-65	wet

genus	P	Planting Depth	Start	Grow
Nepeta		crown at soil level.	35-55	dry
Oenothera	Y	crown at soil level.	35-55	dry
Omphalodes	Y	crown at soil level.	45-65	
Ophiopogon		crown at soil level.	45-65	
Paeonia		eyes at soil level	35-55	
Panicum		crown at soil level.	45-65	
Papaver	Y	crown at soil level.	35-55	
Pennisetum		crown at soil level.	45-65	
Penstemon	Y	crown at soil level.	35-55	dry
Perovskia	Y	crown at soil level.	35-55	
Persicaria		eyes at soil level	35-55	
Phlomis		crown at soil level.	45-65	dry
Phlox	Y	eyes at soil level	35-55	
Phygellus		crown at soil level.	45-65	
Physostegia		crown at soil level.	35-55	wet
Platycodon	Y	Crown ABOVE soil	45-65	dry
Polemonium	Y	crown at soil level.	35-55	
Polygonatum		just below soil level	35-55	
Potentilla		crown at soil level.	35-55	dry
Primula	Y	crown at soil level.	35-55	
Pulmonaria	Y	crown at soil level.	35-55	dry
Pulsatilla	Y	crown at soil level.	35-55	
Rodgersia		just below soil level	35-55	wet
Rudbeckia	Y	crown at soil level.	35-55	
Ruscus		crown at soil level.	35-55	
Salvia	Y	crown at soil level.	35-55	
Sanguisorba		just below soil level	35-55	
Scabiosa		crown at soil level.	35-55	
Sedum	Y	eyes at soil level	35-55	dry
Sidalcea	Y	crown at soil level.	35-55	
Sisyrinchium		crown at soil level.	35-55	
Smilacena	Y	crown at soil level.	35-55	
Solidago	Y	crown at soil level.	35-55	
Sphaeralcea		crown at soil level.	45-65	
Stachys	Y	crown at soil level.	35-55	
Symphytum		crown at soil level.	35-55	
Teucrium		crown at soil level.	35-55	
Thalictrum	Y	just below soil level	35-55	wet
Tradescantia		crown at soil level.	35-55	wet
Tricyrtis		just below soil level	35-55	
Trollius	Y	crown at soil level.	35-55	
Verbascum	Y	crown at soil level.	35-55	dry
Veronica	Y	crown at soil level.	35-55	
Veronicastrum		just below soil level	35-55	
Vinca	Y	crown at soil level.	35-55	
Yucca		crown at soil level.	45-65	dry

**Plant Table**  
P = Priority Planting