

## A Lesson in the Planting Depth of *Perennials*

Dr. William Miller  
Cornell University  
Ithica, New York

# Plant High!

**A**t Cornell University, we have enjoyed a productive relationship with the Dutch flowerbulb and perennial report industry. Since 1998, we have been doing research that we believe is immediately useful to the industry. Most of our work is focused on bulbs, especially including tulips, lilies, hyacinths, daffodils and the many other “special bulbs” that are forced as pot plants or sold as “sprouted or green plants” in the spring. Some of our research also involves perennials, especially as related to storage, shipping and handling.

### High Planting Equals Better Growth!

In an earlier PPA Newsletter, we reported on work we conducted a couple years ago on bareroot perennial regrowth, and especially on the benign effect of washing as a factor affecting regrowth. As part of this work, we did a small, almost “throw-away” experiment looking at planting depth. The results were rather amazing. For example, *Geranium cinereum* ‘Ballerina’, showed a nearly absolute aversion to deep planting (deep planting being defined as planting the top of the crown 1-1/2” below the

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This is the second of two articles by Dr. Miller. The last PPA Journal included an article regarding handling bareroot material.

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soil surface). Essentially every plant failed to grow if the crowns were planted “deep”. High planting, on the other hand, resulted in nearly 100% survival and good growth.

Since this initial experiment, we have done several, larger experiments on planting depth of bare root perennials. All of the experiments were conducted at Cornell in April through June, using bareroot generously donated by Eric Olson and Jack de Vroomen of Jac. Th. de Vroomen (Holland). Crowns were planted “high”, with the buds and upper crown at or slightly above the soil surface, or deep, with the top of the crown about 1-1/2” deep. We typically used 6” pots, and MetroMix 360, a common greenhouse planting mix. Almost without exception, all species tested performed better if the bare root was planted so that the top of the crown and its buds were at, or slightly above the soil surface. The photos nearby show results of a typical planting depth experiment with *Filipendula*, *Geum*, *Hosta*, and *Salvia*. You will note much better growth from the crowns planted high than in those planted “deeply”, independent of whether or not the pots were also waterlogged by placing them in plates of water.

### What is High?

The photos nearby provide a number of examples of bare root crowns, their parts, and what crowns look like when planted “high”. It is hoped these examples will provide useful aids to your planting crews. These images may also be downloaded and printed from our web site at <http://www.flowerbulbs.cornell.edu> by clicking on “Recent Publications”.

### Limitations?

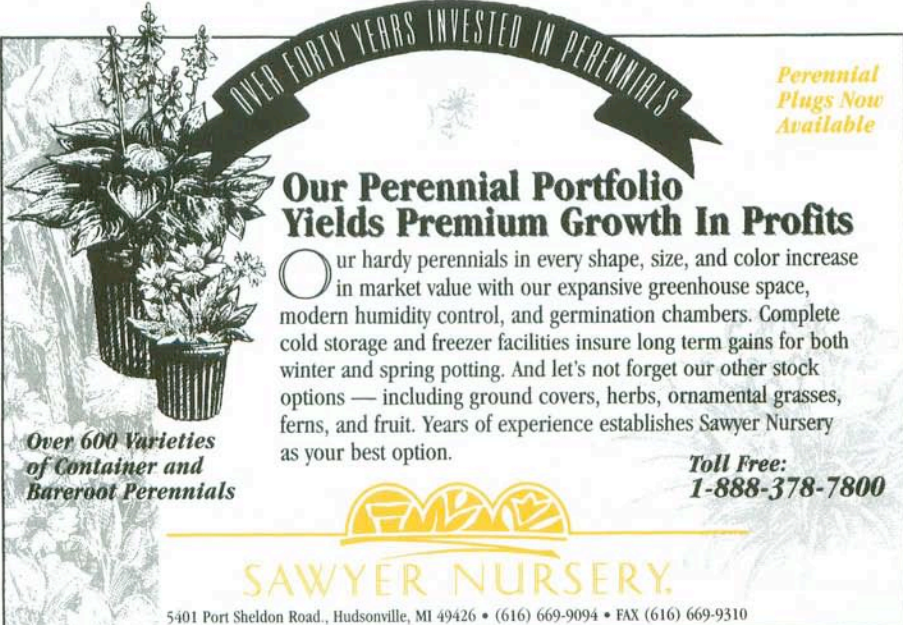
While I believe the results of these experiments are valid, I also realize that each planting situation is unique and that the membership of the Perennial Plant Association knows a thing or two about perennials, and how they grow in their nurseries. So, I would not be surprised that your own experience might indicate that some plants do better with “deep” planting. We have not examined all plants, nor do we intend to. If your experience indicates otherwise, I would not encourage you to drastically alter



and possibly more prone to winter injury. Indeed, this is a theoretical possibility...whether it is real or not will require further trials and/or observation in the industry. A more likely scenario for winter injury from high planting is over-wintering of containers. Again, I do not have specific results to share on this point. Alternatively, one could look from the point of view that over-wintering is a moot point for a plant that failed to establish itself in the container as a result of deep planting.

### Conclusion

The clear conclusion is that you should pay very close attention to your planting practices, and evaluate what happens to your material from the moment it is planted until it is ultimately set on the ground or bench. Sloppy planting on a planting machine and a bumpy trailer ride to a bed in the back-forty of the nursery could cause bareroots to migrate deeper in the pot, with negative consequences for growth. This is an example where even the highest quality product might deliver poor performance and fail due to the negligence of the grower.



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While there are definite examples of failure caused by poor quality plant material, this study indicates significant effects of something as seemingly innocuous as planting depth. The bottom line is that success with bareroot perennials depends on the supplier (domestic or foreign) delivering a high quality product, and the grower handling, planting, and caring for it correctly.

### Reasons To Plant High

- For much better growth of bare root perennials compared to crowns planted deeper.
- We recommend:
  - Plant so the crown (intersection of the roots and shoots) is *at or slightly above the soil surface*, after watering and settling
  - See our Research Newsletter for full details at:  
**[www.flowerbulbs.cornell.edu](http://www.flowerbulbs.cornell.edu)**
  - Then click on “Recent Publications”

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Growth of *Filipendula purpurea* 'Elegans' as affected by planting depth and soil water status. L to R: Planted high, normal water; planted high, water-logged; planted deep, normal water; planted deep, water-logged.



Growth of *Geum rivale* 'Album' as affected by planting depth and soil water status. L to R: Planted high, normal water; planted high, water-logged; planted deep, normal water; planted deep, water-logged.





Growth of *Hosta* 'Abiqua Moonbeam' as affected by planting depth and soil water status. L to R: Planted high, normal water; planted high, water-logged; planted deep, normal water; planted deep, water-logged.



Growth of *Salvia nemorosa* 'Amethyst' as affected by planting depth and soil water status. L to R: Planted high, normal water; planted high, water-logged; planted deep, normal water; planted deep, water-logged.

## **\*\*Winter Journal Article Review\*\***

**This page is a synopsis of salient points from Dr. Miller's previous article.**

Bareroot perennials are a major component of the perennial industry. They can be produced domestically, or imported as washed, soil-free roots or crowns.

Bareroot crowns or divisions have both advantages and disadvantages for the perennial grower, among the following:

### **Advantages of bareroot:**

- Available in wide assortment of major cultivars and varieties
- Available both domestically or as imported items
- Available in a range of sizes or grades
- Larger plants available in a shorter time
- Can be very cost-effective
- Plants are easily stored frozen; planting and bloom times can be staggered; cold requirements are met
- Plants can tolerate cooler temperatures after planting, compared to greenhouse-grown liners

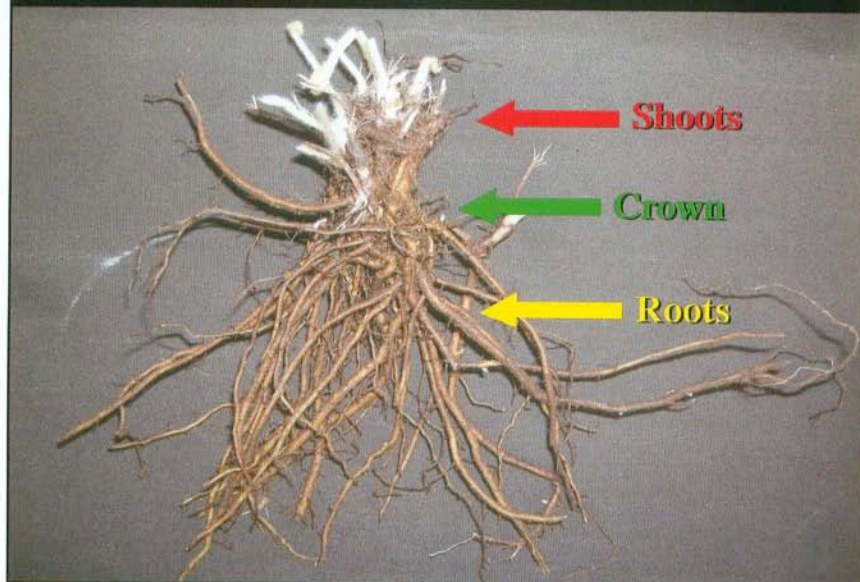
### **Disadvantages of bareroot:**

- Obvious distinguishing characteristics (e.g. foliage color or markings) are absent while bareroot
- Roots and crowns are very susceptible to drying (quality, vigor loss)
- Time frame of availability is somewhat limited. There is a distinct limit in seasonal availability
- Growing practices after planting need to be very carefully monitored
- Optimum/detailed storage and handling procedures per species/cultivar are not known
- Some plants do not thrive bareroot handling
- Washing of plants to remove soil (to comply with USDA-APHIS import regulations) is thought to injure roots

The pictures on the following pages are examples of perennials that are planted high.



*Anemone* 'Honorine Jobert' crown



*Anemone* 'Honorine Jobert' "planted high"





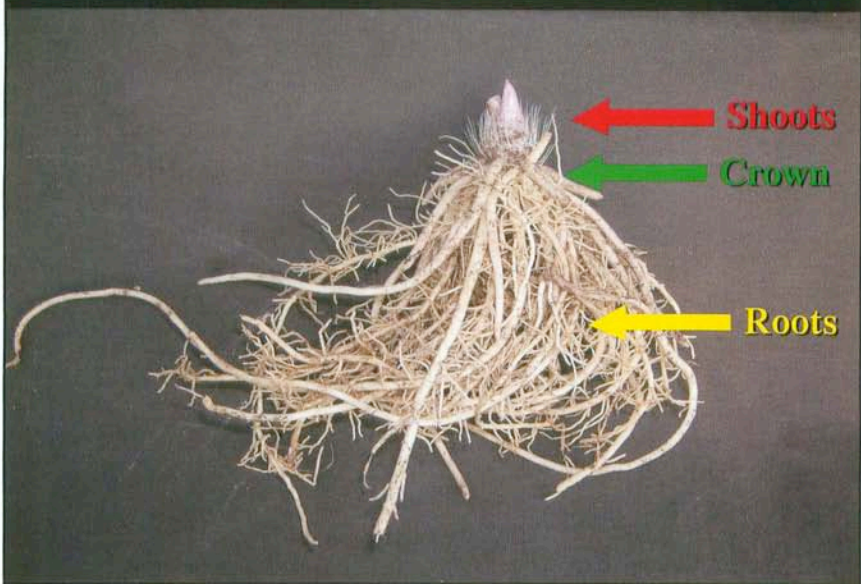
*Epimedium sulphureum* crown



*Epimedium sulphureum* “planted high”



*Hosta* 'Queen Josephine' crown

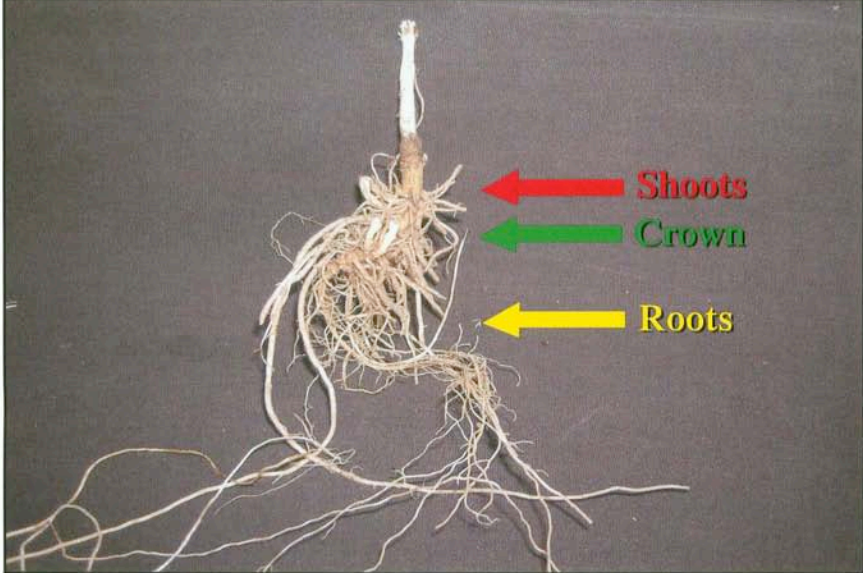


*Hosta* 'Queen Josephine' "planted high"





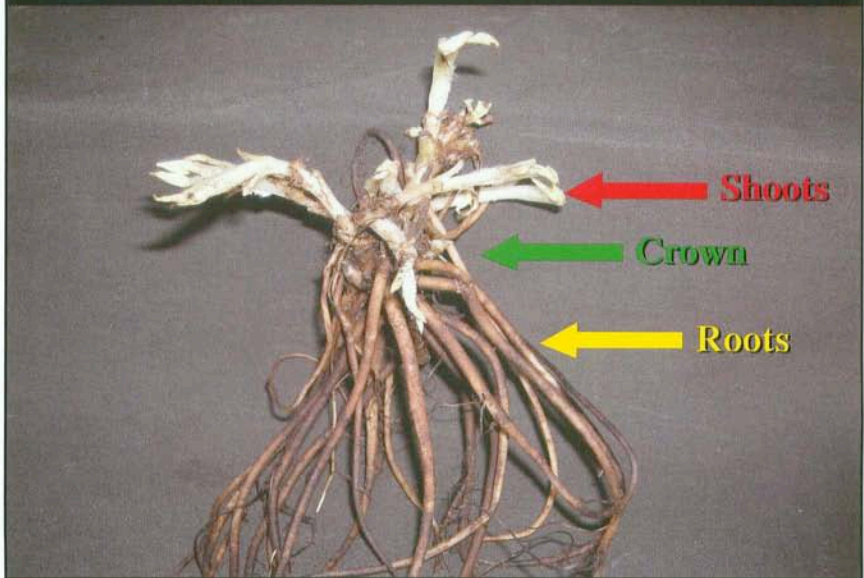
*Phlox paniculata* 'Laura' crown



*Phlox paniculata* 'Laura' "planted high"



*Pulmonaria sacchara* 'Dora Bielefeld' crown

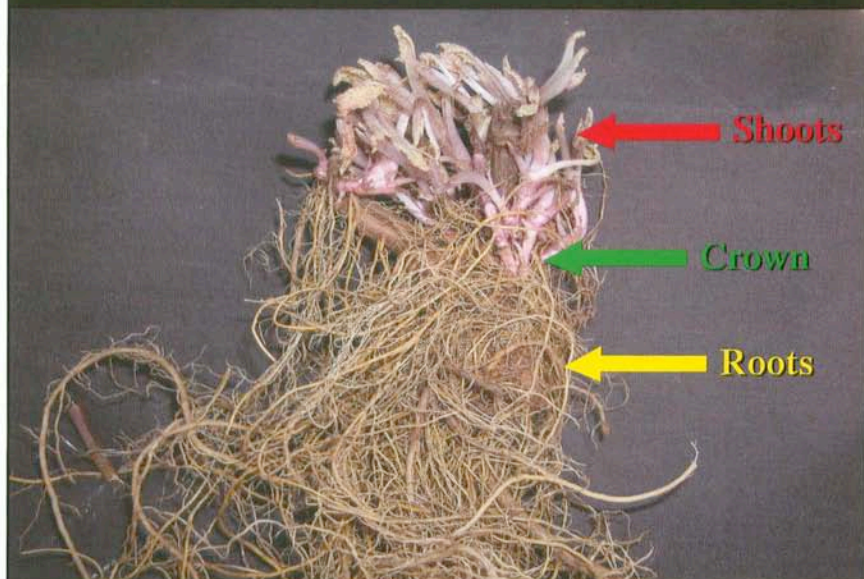


*Pulmonaria sacchara* 'Dora Bielefeld' "planted high"





*Salvia nemorosa* 'Carradonna' crown



*Salvia nemorosa* 'Carradonna' "planted high"

