

Series: Hydrangea Helium

Recommended Containers: 4" and 6" pots for holiday sales or weekly sales

Receiving and Establishing Pre-Cooled 4" Dormant Plants:

Hydrangeas are usually shipped in the late fall through early winter, after they have received the required (information above) cold storage treatment. They are received as dormant plants in 4 inch pots or as bare-root previously grown in 4 inch pots. Unpack and water immediately upon arrival. Newly received plants should be allowed to acclimatize for several days prior to transplanting into the finish pots. At transplant, the existing root ball should be covered with new soil to eliminate 'wicking' of moisture from 4 inch root ball and reduce excessively drying of plants. The ideal starting temperature for hydrangeas forcing is 60 to 62°F (16° C) soil temperature supplied with bottom heat, while maintaining slightly cooler air temperatures 58°F (14° C). One of the main problems encountered with hydrangeas is poor root establishment. Some conditions which may cause this are identified below.

Drying of the 4-inch root ball and subsequent shrinking of the root ball from the new soil in the larger finishing container will create an air gap between the two soils. Be sure to have good contact between both the new and old soil. The plant will start to leaf out while the roots are in the 4-inch root ball only. Water depletion of the 4-inch root ball occurs very fast and may not be noticed, especially when the new soil covers the top of the 4-inch root ball (which is recommended). Two practices can help to overcome this problem eliminating root problems or short stems.

- 1) Scarify the 4-inch root ball with a knife or metal tool. Do not be afraid to rough up the 4" soil ball to insure good contact with new soil. New roots can reach the side of the pot in two-three weeks using this method with adequate watering of root ball.
- 2) After transplanting, irrigate only the 4-inch root ball rather than the new soil in the larger pot. Once the roots emerge and start to grow, start to water both equally. The new soil should not become so saturated that the root development is deterred. If a drip tube (Chapin) irrigation system is used, place the emitter directly on the 4-inch ball. If plants are irrigated with over-head watering, the concentration of water should be directed to only the 4-inch root ball. If sub-irrigation is used, it is suggested for the first 10 days to overhead irrigate until roots have reached into the new soil.

High temperatures can inhibit root growth. High temperatures will also force too much leaf growth, too quickly. The new root development (or lack of roots) will have to support all the new leaf area in weight and water uptake.

Too high of fertility in the new transplanting soil may also deter the roots in penetrating the new soil. Fertility is usually low in the 4-inch ball because of efforts to gradually harden the plant prior to storage, slow growth and to encourage leaf drop. Most soils contain a starter charge of fertilizer which is low and will not cause a problem. Be

cautious when incorporating slow release fertilizers in soil mixes that it does not release too quickly or at too high of EC. More importantly, do not start irrigating with a high EC liquid fertilizer.

Forcing – Timing and Temperature:

Forcing temperatures can be delivered in different combinations of day and night temperatures but generally are offered at 60° F (15° C) nights with 70 to 75° F (21 to 23° C) days. A recommendation of starting and finishing cool will create high quality plants. Begin with 60 to 62°F (15 to 16° C) day and night for root development and slow initial leaf expansion. Temperatures can then move to 68 to 70° F (20 to 21° C) days / 60° F (15° C) nights. Temperatures for finishing should be dropped to 54° F (12° C) nights to harden plants and brighter sepal color. Once color is showing on sepals, reduce fertilizer rates to half. Fully open flowers (full color) are tender so excessive drying of plants, high soil EC levels and high light dehydrating the sepals will need to be avoided.

<u>Intervals of forcing</u>	<u>Night Temperatures</u>		
	54 F-(12 C)	60 F-(15 C)	66 F-(19 C)
Planting to Bloom (in weeks)	16	12	10
Flower diameter to bloom (wks)			
0.5 cm	10	8	7
2 cm	7.5	6	5
4 cm	5	4	3

Plants that are too short:

Gibberellin hormone can be applied as a spray once or twice beginning when the flower heads are no bigger than a pea or *at most* a dime. The treatment will increase plant height without influencing flower head formation. If applied later, flower heads can be very adversely affected--that is they will be loose, open and often unsaleable.

Pro-Gib, a named brand product, containing gibberellin in the amount of .0391 percent active ingredient, is most often used. Applications at 5 ppm active ingredient (that is, 5 mls per 10 gallons of water) are recommended and the amount of spray is to run-off. A second application can sometimes help in forcing very early crops (pre February finish). The finishing grower needs to be diligent the first three weeks after transplant to make sure elongation of stems is taking place so applications can be early enough.

The effects of gibberellins on elongation of stems can be overcome with B-Nine or Cycocel applications **but has no effect** on flower development if gibberellins are applied later than recommended.

Gibberellins are recommended for early February crops due to short days, winter's cloudy conditions and a minimal amount of cooling treatment. The plants received for

this forcing during this time of year have only seen 6 weeks of cooling while plants shipped for Easter and later have received 4 to 8 weeks **additional**.

PGR- Plant Growth Regulator

Late season forcing can be the toughest culturally for excess stretching of internodes and soft growth (extremely large flower heads with soft sepals). Warm day temperatures and cool night temperatures sets up natural 'Positive DIF' developing taller, softer plants. Delivering a negative DIF is important during this time of year by opening vents; reduce light intensities with the use shading products. During early season forcing (Valentine's Day and early Easter), plant heights are more controlled with more control of both day and night time temperatures and reduce light levels. Cycocel spray applications are the most popular PGR at 1500 to 3000 PPM at 10 to 14 day intervals (depending on variety). B-9 applications at 1,500 to 5,000 PPM is also recommended depending on amount of control required, age of crop and environmental conditions (outside temperatures). Both Cycocel and B-9 are recommended mid-growth cycle prior to color formation on flower buds. Bonzi drench is a great tool when the height you wish to achieve has been obtained. Bonzi at 1 to 3 PPM drench will hold the plants at a checked height without reducing the flower size drastically.

Blue Flowers. Applications should not be initiated until at least the 4th to 5th and even 6th week as to help the roots to move out into their new surroundings. Apply 8 fl oz of drench per 6 inch pot using 10 lb aluminum sulfate per 100 gallons of water. Drenches should be applied to moist substrates only as drenching dry soil will result in damaged roots. Make applications at 10 to 14 day intervals. About 10 days after each application, measure the pH of the substrate. If the pH is higher than 5.6, another application of aluminum sulfate should be made. Aluminum becomes more available at lower pH's.

Pink Flowers. Avoid supplying aluminum to pink flowering plants; do not use mineral soil in the substrate and use fertilizers that do not contain aluminum. Use relatively high levels of phosphorus in the fertilizer program. Rotating mono-ammonium phosphate (11-53-00) into the feed program will also help raise phosphorus levels if you don't have naturally alkaline water. An example feed program would be continuous feeding using 150 ppm nitrogen from 20-10-20 (10 oz/100 gal) rotated with 100 ppm nitrogen from 11-53-00 (18 oz/100 gal) every third feeding. Try to maintain a substrate solution pH of 6.0 to 6.2. Be careful not to allow the pH to rise much above 6.4, or iron deficiency chlorosis will become a problem.

Disease and insect pests: Aphids, Slugs, Spider Mite, Thrip, Whitefly and Scale.

Pythium and Rhizoctonia spp., Sclerotium spp.- root/stem damage will cause reduction in growth, cause yellowing of foliage (appearing as iron or manganese deficiency) or distortion of growth. Keep soil evenly moist and drench with preventative root rot fungicides.

Botrytis and Powdery Mildew are leaf disorders to be aware of. Regular preventive fungicide sprays will help control fungal diseases along with good air movement.