Culture Details

Echinacea Sombrero®
Echinacea Sombrero Poco™
Echinacea Double Scoop® Deluxe

TISSUE CULTURE Planting and acclimation

- If tissue culture is not planted immediately, store the unopened vessels at room temperature (70F+-) with bright diffused light. Office setting works well. Do not place TC in a cooler.
- Tissue culture vessels should be opened in a high humidity area (80%+), low light (headhouse type setting), with low/no air flow.
    - TC plantlets have no cuticle protecting the leaf from very quick scorch and desiccation.
- Ideal media is "Quickplugs".
    - This media can be opened up and the roots placed inside with no trimming of roots needed (if necessary).
    - Stabilized media minimizes the chance of burying the crown.
    - Stabilized media has superior water holding/distribution properties which reduces the risk of oversaturation.
    - Stabilized media is sterile, minimizing the risk of fungal pathogens.
    - The media should have a minor nutrient charge/EC (<1.2), including phosphorous for healthy root initiation. If nutrient charge is not present (per manufacturer or lab test), media can be watered in with 50-75ppm 20-10-20 fertilizer solution.
- Ideal pH is 6.0-6.5
    - Lower can cause micro nutrient toxicity or calcium deficiency in some varieties.
- Ideal temperature is 70-72F media temperature with bottom heat.
- Liner size can vary depending upon needs. 72 to 105 is most common.
    - Larger liners can be more challenging to manage moisture.
    - Small liners have a greater chance of drying out.
- Upon opening and removing TC from vessels, grade the plantlets into large/long roots, medium/short roots, and no roots. Plant into separate trays.
    - Occasionally the nutrient agar can be dislodged in shipping. Agar should be removed from the foliage by lightly shaking it off the leaves, or by washing the plants in warm water of 75F. (Always be aware of sanitation when re-using water for dipping.)
    - Non-uniformity is the nature of TC with current technologies.
    - Plants with no roots do not HAVE to be planted, but it is best that they are as they will often develop roots.
    - Do not apply rooting hormone.
    - It is not necessary to remove all the agar from the roots.
- After planting, transport trays to the propagation area.
    - Protect trays from exposure to low humidity, air flow, and high light using remay cloth, plastic covering or similar.
- Place trays in the propagation area. *See TC Echinacea Specs for Success.docx for acclimation details.
    - Tissue culture chambers with LED lighting are becoming more common. Similar to a germination chamber for seed. This is ideal.
- Apply Pageant Intrinsic fungicide spray at 6-8oz/100 gal day 1.
    - Do not apply any other chemicals until after acclimated (if needed).
- Once properly acclimated, move to lower humidity, higher light area for growing on liners.
    - Trays that had little or no roots will stay in the propagation longer.

GROWING ON LINERS

- Provide long day lighting during the winter months. 14 hours is ideal.
    - 14 hours as day extension is enough to maintain growth while short enough to delay flower initiation.
    - Night interruption lighting from 10pm until 2am is common.
- Begin feeding.
    - 20-10-20 at 75ppm is ideal to begin. The extra phosphorous can hasten root development.
    - Feed at every irrigation.
    - As plants develop, switch to a cal/mag type feed. (15-5-15, 14-4-14). Gradually increase ppm to 125-150ppm by day 28. At the higher rates, 2X per week may only be necessary.
- When well rooted, around week 4 or 5, apply Configure PGR at 250-300ppm as a spray to runoff.
    - Configure can inhibit active rooting, so adequate rooting is necessary.
    - DO NOT apply configure within 2 weeks of transplanting.
    - Higher rates can cause excessive phytotoxicity.
    - One application is usually very effective for inducing branching.
    - Excessive configure can cause stunting and unevenness in the finished crop.
    - Configure should be used cautiously on Sombrero Poco, as these are already dwarf.
    - Configure is stressful on the plant and can cause leaf crinkling. This is normal. Plants will grow out of it.
- After configure application, if excessive petiole stretch is observed, B9/Cycocel can be applied
    - 3750/500ppm respectively. Spray to runoff under low light/high humidity.
    - Sumagic (uniconazole) can be used cautiously but can be too strong.
- Around week 5, plants can be moved out of long days to natural photoperiod.
    - Short days (if available) will cause the leaves to begin to lay flat, reducing the need to PGR.
    - Under short days, plants can be fed more heavily at 150-175ppm without stretch.
    - *If purpling is noted on lower foliage, use 20-10-20 fertilizer at 200ppm as needed. Under short days this will green up the foliage without causing stretch. However, after 4 or more weeks under short days feed will not green these up. They are going “short day dormant”, which is not detrimental. Plugs can be held for an extended period of time under short days.
- Plants will be ready for transplant around week 8 or not less than 2 weeks after the last Configure application.
    - Configure application less than 2 weeks prior can inhibit rooting into finished container and lead to less uniformity.
    - B9/Cycocel application prior to plant may be done if necessary, though not recommended.

FINISHED CONTAINER PRODUCTION

- Transplant one liner into anywhere from a 6" to a 1.5 gallon container. Black pot or deco.
    - Smaller containers may not be cost effective.
    - Larger containers will require 3PPP to fill out.
    - Pinch any visible budding at transplant and, ideally, the first two weeks after transplant. This is critical. This will provide better bulk and higher flower count at finish.
- Media should be well drained.
    - Peat based media is ideal. Bark is suitable.

    - Wood fiber medias are suitable. Do not exceed 35% on the wood fiber. Moisture management in wood fiber media is a learning curve and can be more challenging.
    - Controlled release fertilizer incorporated is acceptable. Medium to high rate.
    - pH of 6.0 to 6.5 is ideal.
- Environment
    - Temperature: 65F minimum media temperature to get established. *Cooler media temperature will lead to slow rooting, uneven crop and possible losses. Reduce temperature as needed as plants mature. Temperatures can be dropped into the 50's after flower development.
    - Full sun. Outdoors is ideal for summer production. Afternoon shade is beneficial in the deep south.
    - Low humidity. Higher humidity grown early indoors in northern climates can lead to calcium deficiency and softer plants.
    - Long day lighting of 16 hours of night interruption or day extension, if transplanted before April 15.

        *Only apply long day lighting until flower initiation if forcing for spring sales. This is usually for 5-6 weeks. Turning lights off after initiation will keep plants more compact. Plants will continue to flower. See Darwin Perennials website for a detailed video. https://www.youtube.com/watch?v=rqCG8ExqLpY
- PGRs
    - Do not apply configure in finished production. This can lead to several problems.
    - B9/Cycocel may be applied if needed before coloration of flowers.
    - After flower initiation and elongation, Sumagic (uniconazole) may be used cautiously if needed.
- Nutrition-Echinacea are heavy feeders under high light.
    - High rate of controlled release feed works well. If grown outdoors be aware of heavy rainfall that may leach nutrients.
    - Apply liquid feed as necessary.
        - Supplement CRF if needed or leached.
        - 15-5-15 or 17-5-17 feeds at 200-250ppm 1X-2X per week under high light after established. High feed will add bulk and substance to the plants.
        - 20-10-20 fertilizer can provide a deeper green and better leaf expansion under high light. Alternate with a cal/mag feed if desired.
        - If purpling is noted, increase feed and especially phosphorous. 20-10-20 is suitable at 200ppm.
- Water
    - Echinacea prefer hot and dry. However, do not dry excessively. Especially with high fertilizer/EC level and after flower initiation. Good wet/dry cycles can prevent many problems.
    - Be aware of pH creeping up with higher alkalinity water. Media above 6.8 may begin to show micronutrient deficiencies in Echinacea.
- Visit **firstyearfloweringtool.com** for easy and detailed scheduling information.

** This culture sheet should only be used as a guideline. Every operation, media, water, environment and grower is different. Many variables will lead to adjustments in culture. Grower intuition and "reading" of plants is highly beneficial in producing optimum quality Echinacea Sombrero, or any other perennial. Darwin Perennials assumes no liability for related issues. See www.firstyearfloweringtool.com for scheduling information.