

TRANSPLANT BEST MANAGEMENT PRACTICES

There are many factors to keep on your radar during the transplant process. *Simplify the way you think about transplanting BMPs by putting them into three “buckets”—before, during and after transplant.*



[VIDEO: Join Ball Seed Technical Services Specialist Nick Flax for a walk through a greenhouse transplant line.](#)

Before Transplant

Believe it or not, best practices start before anything hits the transplanting line. This includes considerations that pertain to young plants still in their trays, growing media and even integrated pest management (IPM).

Ensure young plants are well-watered prior to transplant. Never plant dry plugs or liners into finished containers. On the 1 to 5 moisture scale (1=air dry; 5=saturated), plug media should be between a moisture level 3 to 4 at transplant.

- Dry young plants can experience drought stress quickly when put into finished containers. This is especially true if they sit on racks for a while before going out to the greenhouse.
- If a crop is too dry, irrigate them slightly but don't saturate the media to moisture level 5.
- Bump them to the back of the line for the day to allow plants to recover from any drought stress and drain off any excess free moisture.

“Prime” your plugs/liners. If you can hold young plants for about one day before transplant, consider giving them a shot of fertilizer at around 250 to 300 ppm N before they leave their trays.

- Many young plant producers leach young plants slightly before ship to improve tone and reduce the chances of leaf/stem breakage during transit.
- A shot of fertilizer the day before transplant can help replenish mineral nutrient reserves and jumpstart growth to get plants established more quickly.
- “Softer” fertilizers with higher proportions of ammonium-based nitrogen (N) and elevated phosphorus (P) are generally best for this application (ex. 20-10-20)

Ensure that finished growing media is adequately moist. Growing media should be between a moisture level 2 to 3 when flats/pots are filled prior to transplant.

- Too-dry media can actively pull moisture away from your plug/liner once it’s transplanted.
- Overly dry media can be hydrophobic and difficult to rewet in finished containers. This can lead to formation of dry, “dead space” in the root zone that stays inhospitably dry for most of the crop cycle, and stifle root development.

Treat “At-Risk” crops with appropriate pesticides. Whether you have downy mildew (DM)-susceptible crops or broad mite-prone species going into finished containers, give them a strong start and treat for these known risks while plants are still at high density in their trays.

- Following label regulations, treat DM-sensitive crops with appropriate fungicides (ex. Segovis or Subdue MAXX). Not only will this get protection on crops earlier in the cycle, but it can reduce your total cost of application (less spray/drench volume needed for a few plug/liner trays vs. several hundred/thousand flats, pots, or hanging baskets).
- Consider plug/liner tray dips with appropriately labeled insecticides/miticides to catch any “hitchhikers” early, before they can multiply over time in your greenhouse. Many oil-based products and other classes of biopesticides are labeled for use in this sort of application.

During/On the Planting Line

It’s easy to make mistakes or get “handwork hypnosis” when you or your crew spend hours on the line this time of year. Even automated transplanters can fall out of calibration and

cause issues, so perform periodic spot-checks throughout the day. This can help you avoid downstream issues or the need to rework crops before plants hit the greenhouse.

Check container fill regularly. Ensure that all pots/flats have a uniform, loose fill (no compaction), and that containers are filled with media all the way to the top edge of the pot/flat insert.

- Remove large sticks and debris before young plants are put in.
- Break up or remove any large clumps of growing media.
- Periodically take a pot/flat insert and test for compaction. You should be able to poke the full length of your index finger down into the soil column with little effort. If media is so compact that you have to use much force, adjust your pot/flat filler to loosen the fill. A combination of belt speed and/or roller/brush adjustments will typically do the trick.

Dibble a hole appropriately sized to your input. This may seem straightforward but it is a common problem that we see in freshly transplanted crops.

- Don't make a massive crater in the middle of the pot for a 512-plug and don't cram a 50-cell plug into a hole better suited to a 288-plug.
- Have a few standard dibblers readily available on your transplant line and ensure that your crew knows which size to use and when.
- Ensure that the top of the plug/liner media is level with the top of the growing media in the finished container. If plants are too deep, slow rooting may occur and the potential for stem rot issues greatly increase. If plants are sticking out of the top of the soil, plugs/liners may dry down too rapidly and become stressed.

NOTE: There are exceptions to this rule. For example, cyclamen plugs should be planted slightly above grade of finished container media ... so be sure your crew is aware of any such crops beforehand.

Water plants in immediately after transplant through a water tunnel. A water tunnel with multiple, consecutive stages of emitters that provide gentle streams of water work best.

- You do NOT need to water plants up to container capacity on the transplant line. The goal is to provide at least 1/2 of the total water needed and provide the rest once plants are out in the greenhouse.
- This will help “glue” young plants into place and minimize the potential for dislodgement during transit to the greenhouse, reduce the risk of drought stress, and begin to develop headspace in the top of the containers.

Lastly, don’t leave fresh transplants on racks for days on end—get them out into the greenhouse ASAP!

After Transplant

This is your final opportunity to make necessary adjustments and get plants started off on the right foot. Be sure to:

Double-check plug/liner planting depth. If you notice that some young plants have gotten buried during the transplant and transit process, take a few minutes to adjust their depth while setting them down on the bench/floor.

- It’s WAY easier to adjust plant depth before they’ve started to root in!
- If adjustments can be made while offloading them from carts, this minimizes the number of additional “touches” to the crop.

Water plants in the rest of the way. A common “oops” that occurs after transplant is growers forget to water plants in the rest of the way. Failure to do this can have a major impact on crop establishment and other downstream issues. Watering crops up to container capacity:

1. Finishes development of headspace in the tops of containers, and
2. Solidifies the soil “matrix” and (effectively) connects all the substrate components in each pot or flat insert.

Well-developed headspace ensures that future water, fertilizer, or pesticide drench applications can move through the soil column as a front when headspace is filled quickly at the time of application. A well-formed soil matrix ensures that there aren’t any dry pockets in the soil column, that any potential air pockets collapse, and roots can utilize the entire soil profile to develop.

- Depending on your fertilizer strategy, you can do your final watering-in with clear or water-soluble fertilizer (WSF).
- In general, it's best to water finished crops in with WSF. Nutrients are readily available to plants as soon as it's applied and you can adjust ppm N as needed, depending on the crop.

If you have controlled-release fertilizer (CRF) in your mix, you can choose to just apply clear water at this stage. However, there is a bit of lag-time for the release of nutrients from CRF. As such, an initial *fertigation* with WSF after transplant—even at a lower concentration (around 150 ppm N)—is generally advisable if you have CRF mixed into your soil.

Release any bio-controls. It's never too early to get your IPM strategy working! Once plants are in their destined growing space, deploy any of your mainstay predators and/or parasitoids to keep pest populations low from the get-go.

- If any of your young plants received pesticide treatment right before transplant, be mindful of any potential residual effect on your bios.
- Many predatory mites and insects do not like high levels of canopy moisture. If foliage is still very wet, you may want to wait a little while until the canopy dries somewhat to release these.
- Wait until after you water crops in all the way to deploy things like parasitoid pupal “hang tags” (ex. *Encarsia/Eretmocerus*) or they may become dislodged or completely soaked by overhead irrigation.