

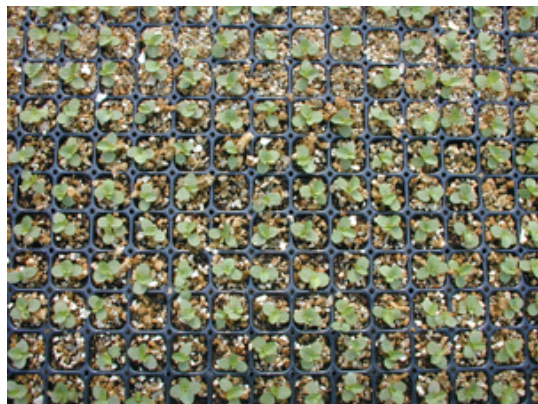
GROWERTALKS

Features

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Crop Culture: Increase Useable Seedlings

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This year, everyone is focusing on reducing costs, and the biggest way to reduce your production costs is to reduce the shrink, which is generally considered to be losses in production or excess production that does not get used or sold. In plug production, that means increasing the number of useable seedlings per plug tray and only seeding the plug trays you need for transplanting or sale.

It's easy to sow a number of plug trays and get 75 to 85% stands, but you can do better with higher seed quality, more precise seeding and germination conditions, and by paying attention to your moisture management. If you can get stands consistently in the 90s, you'll need fewer plug trays and less labor to transplant or replug them, and you'll have a more uniform finished product.

Seed quality and sowing

The first step in improving germination and increasing the number of useable seedlings is purchasing the highest seed quality you can. It's easy to look at your total seed costs and want to purchase cheaper seed. But cheaper seed may be lower quality seed, so beware! Look into using more pelleted or coated seed if you have difficulties sowing certain types of seed accurately. And try not to overbuy seed one year and hold onto it for another year. Even with good seed storage conditions of 40F (4C) and 25 to 35% relative humidity, some seed does not store well from one year to the next. Impatiens seed is the most critical to use up every year. Also, certain seed enhancements don't store well, such as primed, scarified, detailed or defuzzed, coated and pelleted. Pay attention to sow-by dates, and log in when you receive seed. Do a seed inventory at least twice a year, and decide if it's worth it to carry over seed, dump it or use it up quickly.

If you reuse plug trays, make sure they are cleaned and disinfected properly. I see problems every year with either root rots such as thielaviopsis and pythium or Bonzi residues adversely affecting seedling growth and plug yields. For hard-plastic plug trays, you need to use steam sterilization at 160F (71C) for one hour. For other plug trays, wash off soil and use fresh disinfectants such as quaternary ammonium salts for at least 30-

minute dips.

Filling plug trays and dibbling them correctly greatly influences seed placement and uniform seedling growth. Make sure you add the correct amount of moisture to the plug media before filling flats in order to fluff up the peat moss. Use the squeeze test to check the moisture: Take a handful of media after adding moisture but before filling trays and squeeze it. No drops of moisture should come out. Open your hand and the media should still retain its shape. If it falls apart right away, it is too dry. Press on it lightly and it should fall apart. Now you will get good fill in your plug trays and no shrink or settling of the media thereafter. Test the fill across the plug tray by pressing your finger lightly on the surface and determine if your flat filling is uniform.

Dibbling is very important for getting the seed into the middle of the cell and having enough room to cover the seed with plug media or coarse vermiculite for best germination and rooting in. Do not bury begonia seed! It's easy to give begonias a little too much dibble and bury the seeds with the first few waterings. Germination and stands will be greatly reduced if this happens. On the other hand, use a deeper dibble for larger seeds that need more covering. You should not see the seed or soil surface after covering large seeds and watering them. But you should see the ribs of the plug trays to avoid roots growing across the top of the trays. Some crops need to be covered and other crops do not. Make sure you cover consistently!

Seeding accuracy sometimes gets taken for granted. But remember this: You will never get a useable seedling if you don't get the seed into the cell! Even under the best conditions, loss due to seeding inaccuracy may be 2 to 5%. How often do you check your seeding accuracy?

Germination conditions

Whether you germinate on the bench or in germination chambers, you need to provide the proper conditions for each crop. This means you need to group crops by temperature. Moisture is also very critical for germination. If you use a germination chamber, you need to add the correct amount of moisture for germination and have your germ chamber keep that amount of moisture until trays are taken out onto the bench. I see some germ chambers adding too much moisture or uneven distribution of fog, which causes some trays to stay too wet or too dry.

Light isn't really needed for germination of most crops, but will help finish germination on crops such as lisianthus, begonia, impatiens and petunias. If you use a germination chamber with no or very little lighting, then avoid leaving plug trays in the chamber too long. Germinating on the bench is no problem with lighting.

Finally, watch out for loss of seed or seedlings from mice, birds and slugs. Mice particularly like verbena, pepper and salvia seeds. Look for disturbances in your covering of these trays, as you probably don't have any seed there anymore. Birds will eat seed and pluck off seedlings, but you can usually see if birds are hanging around. Slugs can be a problem with wet areas and are diagnosed by their slime trails.

Moisture management

Once you get good quality seed accurately into the plug cell and provide proper germination conditions, moisture management after the seedling is up will determine whether you get good rooting, uniform seedling growth and a healthy seedling ready for transplant or shipping. Wet growers will have more problems with stretch, poor roots and diseases, whereas dry growers will have more problems with losing seedlings along

the edges of plug trays and maybe burning some roots. I work with a lot of plug growers getting them to understand that moisture management has to depend on how that particular crop likes to grow roots. Generally, a plug grower who can uniformly grow petunias has difficulties with begonias, and vice versa. This is because these two crops have very different root development in the early stages. Petunias send down a quick taproot, which wants to branch when the plug cell is drier. This keeps the growth more uniform and green. Petunias that are overwatered after germination won't develop the same healthy root system, and will show problems with yellowing, stunting, and boron deficiency. The key to uniform seedling growth with straight colors of petunias is to dry them down hard before watering again. Do this for a week after the cotyledons have opened and the first true leaf is just showing and the roots will branch.

With begonias, it's just the opposite of petunias. Begonias have a very shallow and fibrous root system until the first true leaf is about halfway out, then the roots will start to go down further into the cell. This means you need to keep uniformly moist conditions on begonias until this stage. If the surface of the media turns a lighter color, you will stall out the growth of those cells. The seedlings do not die or wilt; they just don't grow as fast and may turn harder with curled-down leaves. This appearance looks a lot like Bonzi overdose. Once the first true leaf is halfway out, you can dry off the soil surface, but not more than halfway down the cell. Only dry down a begonia plug all the way once the roots have reached the bottom of the cell.

If you do a good job with keeping uniform moisture on begonias, then you may run into problems with algae growing on the soil surface. The key is to keep algae from forming a crust that impedes watering and feeding the plug, along with harboring fungus gnats and shoreflies. Algae like moist and low light conditions, along with fertilizers high in phosphorus and iron, and warm temperatures. Make sure your water source does not have algae and that your pipes are clean. Using copper ionization, ZeroTol or other water disinfection systems will help control algae in plug production.

Root and crown rots can wipe out seedlings of susceptible crops such as alyssum, petunia, pansy, vinca, celosia and verbena. Diseases such as pythium, rhizoctonia and botrytis can be found with poor moisture management, improperly disinfected reused plug trays, drips in double poly greenhouses, poor air circulation and high humidity, too many seeds per cell and holding plug trays too long. No matter your method of watering, you need to apply the right amount at the right time to each crop. Fungicide applications will not overcome problems with moisture management.

PGRs and fertilizers

Problems with uniform seedling growth can occur with incorrect applications of chemical growth regulators. Over application of A-Rest, Topflor, Bonzi, Sumagic or their generics can cause long-term stunting of impatiens, petunia, salvia, vinca, coleus, ageratum, pansy and viola. Drift of these chemicals may hit sensitive crops such as begonia and dusty miller. In addition, some varieties are slower growers than others, which make application of growth regulators more difficult when all the varieties are being grown together. And don't even get me talking about controlling growth of seed mixes! These mixes are guaranteed to have different vigor based on the colors of the varieties in the mixes. If an overdose of growth regulator is suspected, you can either feed them out of it with high-ammonium type fertilizers such as 20-20-20 or spray with Fascination at 3 ppm.

Your choice of fertilizer will determine plant growth as well as media pH control. Using 20-10-20 will promote

more shoot growth, softer plugs, fewer roots and a lower media pH. However, using 13-2-13 will give more toned growth, better roots and a higher media pH. Under lower light conditions, plugs should be fed with less ammoniacal nitrogen (NH₄) and more calcium. When light levels get higher later in spring, feed plugs with more NH₄ to get the leaf expansion and color needed. Monitor media EC levels to avoid going too high, which damages roots and promotes more root rot. Make sure to water through plugs to keep salts from building up, but allow plugs to dry down enough for good root growth. Early feeding at low rates (50 to 75 ppm N) may be needed if the starter charge in the plug mix is very low or you're growing crops that take a long time to germinate and grow, such as begonia, lisianthus and pentas. Avoid burning growing tips and tender young leaves by rinsing off fertilizer when applied on sunny days. Crops sensitive to this problem include salvia, coleus, ageratum and snaps.

We've covered the major problems with poor germination, uneven growth in plug trays and loss of seedlings. I'm sure you can find more areas that affect the number of useable seedlings you get from your plugs. It takes a lot of focus on a number of areas throughout the plug-growing season to get higher yields. Start with high-quality seed, sow it accurately, provide proper germination conditions, practice good moisture management, and use growth regulators and fertilizers correctly to get the highest and most consistent number of useable seedlings possible from each crop and variety.

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