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Algae in Propagation *Green isn't always good!*

This e-GRO alert will discuss algae on substrate during propagation. You will learn the causes of algae, as well as steps that can be taken to eliminate it.

With the spring season underway, it is time to get cuttings rooted for transplanting. During propagation, growers have enough to worry about- severe wilting from poor moisture management, nutrient deficiencies from a lack of fertilizers, and delayed or diminished rooting from low light levels. Another problem that can be encountered during cutting propagation is algae growth (Fig. 1).

There are a number of problems that can be associated with algae growth on the surface of substrate during propagation. First, it can diminish the market-

ability of your rooted cuttings- nobody is excited to receive a tray of rooted cuttings with algae covering the surface of the substrate! Second, later in



Figure 1. Algae on the surface of substrate during propagation of cuttings.

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the production cycle when more wet and dry cycles are introduced to the rooted cuttings, the algae on the surface of the substrate can form a “crust”, making it more challenging to evenly rewet the substrate during irrigation. Finally, alga present on rooted cuttings can act as a source of inoculum for further algae growth and development following transplant of the cutting into a container.

Understanding algae

Where do algae come from? Although sometimes it may seem like it, algae does not just randomly appear. Like many of the genera used for bedding plant production, algae can reproduce both sexually and asexually.

Algae must have some sort of source from which it

propagates from, and there are several sources in and around the greenhouse. Some of the most common sources of algae are those populations already established in the greenhouse. Common locations where algae are found are those places where water frequently puddles, including under benches, in walkways, and underneath gutters. Algae also grow on equipment that stays fairly moist, including mist nozzles (Fig. 2), benches (especially wooden ones), and propagation trays that are reused.

So how can you minimize algae during cutting propagation? There is no single “silver bullet” that can eliminate algae in propagation. However, there are several steps that, if taken



Figure 2. The mist nozzle on the left is a source of algae during propagation, while the mist nozzle on the right is properly cleaned.

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together, can reduce algae.

Greenhouse sanitation

The first key step to reducing algae growth on substrate during propagation is to put together a plan for improving the sanitation of your greenhouse- and sticking to it. You must reduce algae elsewhere in your propagation house since any algae present in a greenhouse can act as a source for additional algae populations to establish and grow.

The first place to check for algae are those areas mentioned earlier- anywhere that water may pool or surfaces that may stay wet. Also, check the tools and equipment that are used during propagation. It is good practice to routinely use a water nozzle with good pressure, or preferably, a power washer to clean locations and equipment where algae are growing.

Once these areas and equipment are clean, it is a good idea to use an algicide such as a hydrogen dioxide and peroxyacetic acid product (ZeroTol 2.0 or OxiDate 2.0, Biosafe Sys-

tems) or a quaternary ammonium product (Phosan 20, Maril Product; GreenShield, Whitemire MicroGen) to kill any remaining algae. There are a number of different application methods for these products, so be sure follow the label instructions. Also be mindful of any plant material in the greenhouse that may come into contact with some of these chemical treatments- phytotoxicity can be a problem, and one you'd rather avoid.

Modifying the greenhouse environment

There are some opportunities to modify the greenhouse environment that can help suppress the growth of algae. The first is modify the misting schedule for your greenhouse crops. Since cuttings do not have roots when they are placed into propagation, mist is applied to minimize water loss of cuttings and keep them turgid. One way that the frequency and duration is determined is by watching the cuttings and adjusting mist accordingly. Sometimes mist is actually being applied more frequently to manage low humidity in the greenhouse- the real cause

of cuttings wilting quickly. However, when mist is being applied frequently it will leave the surface of the propagation substrate wet, resulting in algae growth.

One way that mist can be reduced is to use humidification. When humidification is used, both the frequency and duration of mist applications can be reduced. This can help reduce the amount of free water on the substrate surface and, therefore, minimize algae growth. However, it can be a fine line to tread, because if humidity is maintained too high, algae can still pose a problem in greenhouses.

Finally, another way that you can reduce the algae on the surface of propagation substrate is to increase the air circulation in the greenhouse. That can help promote substrate to dry down a little bit. Plus, this will have other additional benefits when rooting cuttings. Increasing air circulation can increase transpiration which, in turn, can increase uptake of secondary macronutrients and micronutrients that are taken up passively with water (such as calcium).

Freely available mineral nutrients are another factor that can contribute to the proliferation of algae.

During propagation of cuttings, fertilizers are applied to cuttings by using water-soluble fertilizer in the mist (Fig. 3). The free mineral nutrients on the surface of the propagation substrate are one contributing factor to algae growth. Instead of using water-soluble fertilizer in the mist line to provide mineral nutrients, controlled-release fertilizer may be an alternative strategy to provide nutrients during propagation.

Previous research at Purdue University has shown that controlled-release fertilizers can be incorporated into substrate used for cutting propagation and



Figure 3. Petunia cuttings receiving excessive water-soluble fertilizer applied in the mist during propagation. *Photo courtesy of Roberto G. Lopez.*

the cuttings produced in substrates containing controlled release fertilizers are of good quality (root and shoot growth) and tissue nutrient concentrations.

https://ag.purdue.edu/hla/lopezlab/Documents/ExtPubs/CRF_Bedding-PlantsAndCRFs_GG_August_2012.pdf

Chemical control

Another option to try and deal with algae on substrate during propagation is to employ a chemical application. Although

many algaecides are not labeled for application to plant material, Physan 20 (a quaternary ammonium product) is labeled for this use. Physan 20 can be applied as a substrate drench or can be sprayed on the substrate surface. Regardless of the application method, the mixing is the same— 1 ½ teaspoons of Physan 20 per gallon of water. As mentioned before, be sure to follow all label instructions.

Take home message

It can be frustrating to see algae on substrates

in propagation. Algae on propagation substrate may result in more algae growth during finishing after transplanting. It can also reduce the appeal of your liner and plug trays if they are being sold to other growers. While there is no silver bullet that can be used to reduce or eliminate algae during propagation, careful sanitation of the greenhouse and equipment, modifying the environment and cultural practices, and chemical control are all tools that can be used to help combat algae.