Managing Algae in the Greenhouse

Algae are primitive, simple plants lacking true roots, leaves and stems that contain chlorophyll. The greenhouse provides an ideal environment for their growth and spread. In order for algae to grow, they need water, light and mineral nutrients. Algae reproduce vegetatively by single cell division or fragmentation of colonies. The warm temperatures, high humidity and fertigation that are ideal for your crops contribute to the growth of algae.

The spores and cells of blue green or green algae are ubiquitous. How to manage algae depends upon where it is growing. Treating your water source, treating walkways or structures or treating media surfaces may be needed. Many algacides are not labeled for direct plant treatments because they can be phytotoxic (damaging to plants). Even in the absence of phytotoxicity, some of the products suppress plant growth.

Water Treatment

Irrigation water, especially from a shallow pond or surface water may be a frequent source. Algae can also clog irrigation and misting lines, drip tubes and emitters, causing watering and maintenance issues. For more on water treatment, see the references listed at the end of this factsheet, for example, Clean Water3 website at http://cleanwater3.org

Figure 1: Algae clogging irrigation lines. Photo by L. Pundt

Growth of algae on the growing media

The growth of algae on the growing media may be especially troublesome in propagation, either with slow growing plugs or during cutting production. Algae compete with desirable plants for nutrients. Eventually, they form an impermeable layer or "crust" on the growing media surface that can interfere with water penetration and reduce plant growth.

Figure 2 & 3: Algae on growing media surface and forming a crust. Photos by L. Pundt

Figure 3: Algae are a food source for shore flies. Photo by L. Pundt

Growth of Algae on Walkways, Greenhouse Coverings

If severe, excessive algae growth on walkways is a safety hazard to workers and the growth of algae on greenhouse coverings can also reduce light levels in the greenhouse.

Prevention of algae growth is the grower's first line of defense. Algae can be difficult to control and a combination of control methods including **sanitation, environmental modification,** and **the frequent, careful use of disinfectants** are all needed.

Greenhouse Sanitation

- Keep propagation houses as clean as possible. Check for algae in areas with standing water.
- Clean pots and trays before their re-use.
- All surfaces should be kept free of plant debris and weeds that can be a nutrient source for the growth of algae. Power washing before treatment is needed.
- Regularly clean and disinfect greenhouses between crop cycles.
- Water only as needed to prevent excess puddling on the greenhouse floor.

Environmental Modification to Help Suppress Growth of Algae

- Reduce excessive moisture from improper irrigation or misting practices.
- Proper ventilation helps reduce the amount of moisture in the greenhouse.
- Horizontal airflow fans help regulate greenhouse temperatures and reduce excess condensation.
- Retractable roof or open roof greenhouses provide superior ventilation benefits.
- Avoid excessive fertilization, runoff and puddling water on floors, benches and greenhouse surfaces to discourage algae growth.
- The use of porous concrete floors limits the development of excessive moisture in the greenhouse.
- The greenhouse floor should be level and drain properly to prevent the pooling of water.

Proper Cultural Practices

- Train employees on proper watering practices.
- Overwatering crops frequently leads to algae buildup on the surface of the growing media.

- Avoid overwatering crops, especially early in the crop cycle, to allow the upper surface of the media to dry out between waterings.
- Select a growing media with the appropriate drainage for your crops.
- Do not apply excessive fertilizer to your crops.
- Use controlled release fertilizer incorporated into growing media for cuttings during propagation

Disinfectants and Algicides for Greenhouse Sanitation

A number of disinfectants and algaecide are registered for algae control in the greenhouse (See Table 1). When the greenhouse is empty between crops, is and ideal time to thoroghoughly clean and use disinfectants.

Disinfectants for Controlling Existing Algae

Quaternary Ammonium Compounds
Quaternary ammonium compounds include Green-Shield®, Physan 20® and KleenGrow. They can be applied to floors, walls, benches, tools, pots and flats as disinfectants. However, Physan 20 is not for use in greenhouses where food crops are grown.

Before using these quaternary ammonium compounds, pre-clean all surfaces. Contact with any type of organic matter inactivates these compounds. Surfaces should remain thoroughly wet for at least 10 minutes. A fresh solution should be applied daily or when the solution becomes visibly dirty.

A fourth generation quaternary ammonium product (KleenGrow™) can be applied to hard surfaces and to greenhouse ornamental crops as a fungicide and bactericide. KleenGrow is a more advanced Q salt than GreenShield and is more tolerant of organic matter, pH and temperatures changes and hard water. KleenGrow also has some residual activity from seven to 30 days after application. It is labeled as a fungicide on ornamental plants but not greenhouse food crops.

Hydrogen Peroxide & Peroxyacetic Acid

Hydrogen dioxide and peroxyacetic acid (ZeroTol ® 2.0) is labeled as an disinfectant for use on greenhouse surfaces, equipment, benches, pots and trays and for use in chemigation. All surfaces should be thoroughly wetted before treatment. Several precautions are noted on the label. **Hydrogen dioxide is a strong oxidizing agent and should not be mixed with any other pesticides or fertilizers.** Their concentrated form can cause irreversible eye damage and they are skin irritants. When applied directly to plants,

especially if applied above labeled rates or if plants are under stress, phytotoxicity may be of concern.

Hydrogen Peroxide, Peroxyacetic Acid and Octanoic Acid
Hydrogen peroxide & peroxyacetic acid & octanoic acid (X™ 3) is a strong oxidizing agent. It may be used as an algaecide on greenhouse structures, floors etc. For best results, use with water with a neutral pH and low levels of organic materials. Do not use at higher than recommended rates or leaf burn may result. It is advisable to test X™ 3 on a few plants before treating large numbers. Care should be taken when applying X™3 as a foliar spray following applications of metal based products. It is also labeled for use in chemigation.

Sodium carbonate peroxyhydrate
Sodium carbonate peroxyhydrate (GreenClean Pro) is a strong oxidizing agent that is water activated. Upon contact with water, it breaks down into sodium carbonate and hydrogen peroxide.

Table 1. Algicides labeled for use in a greenhouse

Common Name	**Trade Name**	**Target Applications**	**Comments**
Hydrogen dioxide & peroxyacetic acid	ZeroTol 2.0	Use on greenhouse structures, benches, walkways and in watering systems.	Strong oxidizing agent. Works by surface contact. All surfaces must be wet before treatment. See label for specific plant applications. **Organic product.**
Hydrogen peroxide & hydrogen dioxide	PERPose Plus	Use on greenhouse structures, benches, walkways and in mist systems.	Strong oxidizing agent. Apply so that all surfaces are thoroughly wet**. Organic product.**
Hydrogen peroxide & peroxyacetic acid	Sanidate 12.0	Use on greenhouse surfaces and equipment and in greenhouse irrigation systems.	Strong oxidizing agent. Clean all surfaces before treatment. Thoroughly wet all surfaces. **Organic product.**

Hydrogen peroxide & peroxyacetic acid & octanoic acid	X3	Use on greenhouse structures and walkways and in watering systems.	Strong oxidizing agent. Clean surfaces before treatment. Not for use in greenhouses where food crops are grown.
Quaternary Ammonium	Green-Shield II	Use on greenhouse glass or walkways.	Pre-clean all surfaces. Contact with any type of organic matter inactivates these compounds. Surfaces should remain thoroughly wet for at least 10 minutes. A fresh solution should be applied daily or when the solution becomes visibly dirty.
Quaternary ammonium	KleenGrow	Use on greenhouse surfaces and walkways.	Pre-clean all surfaces. Saturate for 10 minutes. Re-apply every 14 days to keep algae from returning. May be used as a drench to control algae on media surface. Test before treating entire crop. Use with caution on young seedlings or tender young growth. See label for information on ornamental plant applications.
Quaternary Ammonium	Physan 20	Use on greenhouse and benches.	Pre-clean all surfaces. Thoroughly wet all surfaces for at least 10 minutes. Not for use in greenhouses where food crops are grown. See label for specific plant applications use.
Sodium carbonate peroxhydrate	Green Clean Pro	Use on walkways, and weed control mats under benches	Strong oxidizing agent. Treat when algal growth first appears. Non-target plants suffer contact burn if granules are accidently spilled on them**. Organic product.**

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References:

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