

by Rosa Raudales
rosa@uconn.edu

Algae on the nutrient solution and surfaces

Algae can affect your bottom line. Prevent algae problems by manipulating the environmental conditions and with proper sanitation.

We observed algae accumulation in almost every hydroponic operation we visit. This is especially true in deep flow hydroponic systems, also known as raft hydroponics. Algae builds up and forms a thick mat on the surface of nutrient solutions, edge of the rafts, and other surfaces (Figure 1).



Figure 1. Algae mat buildup on the water surface of a deep flow hydroponic system. Algae accumulates on the surface of the water, the edge of rafts and

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CONTRIBUTORS

Dr. Nora Catlin

Floriculture Specialist
Cornell Cooperative Extension - Suffolk County
nora.catlin@cornell.edu

Dr. Chris Currey

Assistant Professor of Floriculture
Iowa State University
ccurrey@iastate.edu

Thomas Ford

Commercial Horticulture Educator
Penn State Extension
tgf2@psu.edu

Dan Gilrein

Entomology Specialist
Cornell Cooperative Extension - Suffolk County
dog1@cornell.edu

Dr. Joyce Latimer

Floriculture Extension & Research
Virginia Tech
jlatime@vt.edu

Dr. Roberto Lopez

Floriculture Extension & Research
Purdue University
rglopez@purdue.edu

Dr. Neil Mattson

Greenhouse Research & Extension
Cornell University
neil.mattson@cornell.edu

Dr. Rosa E. Raudales

Greenhouse Extension Specialist
University of Connecticut
rosa.raudales@uconn.edu

Dr. Beth Scheckelhoff

Ext. Educator – Greenhouse Systems
The Ohio State University
scheckelhoff.11@osu.edu

Lee Stivers

Extension Educator – Horticulture
Penn State Extension, Washington County
ljs32@psu.edu

Dr. Paul Thomas

Floriculture Extension & Research
University of Georgia
pathomas@uga.edu

Dr. Brian Whipker

Floriculture Extension & Research
NC State University
bwhipker@ncsu.edu

Heidi Wollaeger

Floriculture Outreach Specialist
Michigan State University
wollaeger@anr.msu.edu

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Algae is a concern in crop production for two main reasons:

1. **Algae competes with plants and results in yield loss.** Researchers in Germany observed that fresh weight and water and nitrogen uptake were significantly reduced when plant grew in tanks with algae (Schwarz and Gross, 2014). Lettuce fresh weight reduced by 30% or more when algae accumulated in nutrient solution tanks in hydroponics.
2. **Algae serves as food for shore flies and fungus gnats.** [Shore flies](#) (*Scatella stagnalis*) and [fungus gnats](#) (*Bradysia* spp.) feed from algae. Consequently, high populations of shore flies and fungus gnats are tightly associated with the presence of algae (Figure 2). Shore flies do not harm plants directly, however, they leave droppings on the leaves which reduce the aesthetic value of crops. Fungus gnat larvae feed on the roots causing direct damage. Both insects can serve as vectors of *Pythium* species from plant to plant.

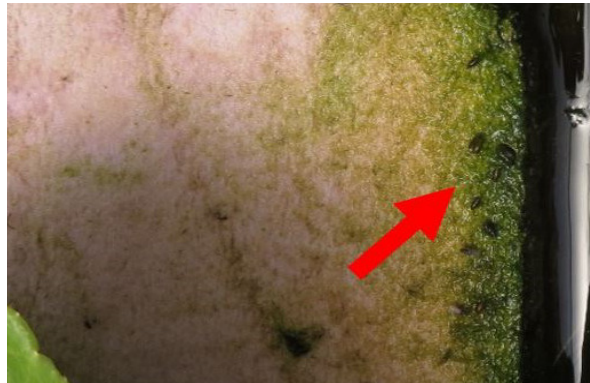


Figure 2. Shore flies (*Scatella stagnalis*) accumulate on areas with high algae concentration

Management:

1. **Avoid direct light on the surface of the nutrient solution and increase aeration.** Algae requires nutrients, light, temperature, stagnant conditions, and organic matter to survive and multiply. Algae accumulates on the edges of the rafts (Figure 1) or in areas where the rafts have broken (Figure 3). Therefore, covering open areas that allow light transmission prevents algae buildup. For this reason, we do not see algae under the rafts. Algae grows best in stagnant nutrient solutions, so vigorous aeration or manual disturbance will reduce algae accumulation.

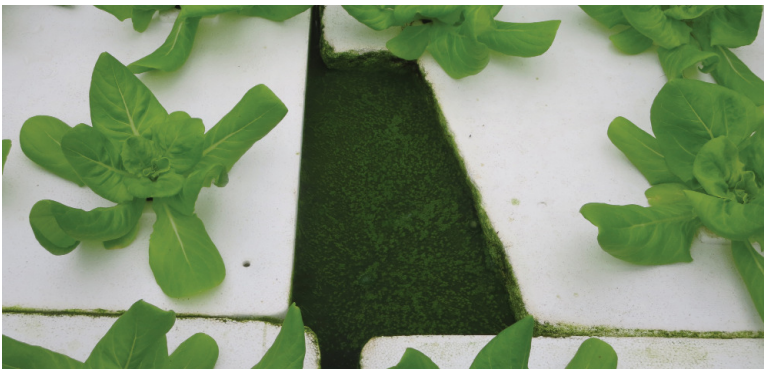


Figure 3. Algae accumulate at the edges of rafts or in areas where the raft is broken. Preventing direct light transmission to the nutrient solutions reduces algae buildup.

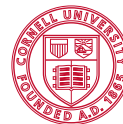
2. **Reduce the inoculum with proper surface sanitation.** Clean the rafts and surface areas between growing cycles. The most efficient way to sanitize any surface is to first remove the debris and then use a chemical sanitizer (Figure 4). Activated peroxygen or quaternary ammonium based products are labeled for this purpose (Pundt, 2015).



Figure 4. Clean rafts and surface areas between growing cycles. First remove the debris and then use a chemical sanitizer product

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Some researchers tested preventive applications of products to control algae in hydroponics and found that the rates at which algae was controlled on water or growing media surface were also toxic to crops (Cossemans, 1995; Vänninen et al., 1998). Therefore, management should focus on manipulating the environmental conditions (light and aeration) and proper sanitation.

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