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
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.

**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.

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

![Figure 4. Clean rafts and surface areas between growing cycles. First remove the debris and then use a chemical sanitizer product.](image)
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.

References: