Algae Causing Clogging of Cooling Systems

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The use of cooling systems in greenhouses has become a common and successful practice in the last few years. These systems generally consist of a screened container holding shredded poplar wood through which water and air are passed. In course of time the filters become clogged and their cooling efficiency is reduced. The frequent cause of clogging is a growth of algae and the wet shredded wood of the filter is green with it.

Microscopic examination has indicated that several green algae common to the soil and air occur in the filters, chiefly the following Stichococcus subtilis (Keutz) Kercher, Stichococcus bacillaris Naegeli, & Ulothrix subtilissima Rabenhorst. In addition a common blue green alga, Phormidium Retzii (CAAg) Gomont occurs. These algae grow in long chains and the latter blue green is coated with a sticky gelatinous layer.

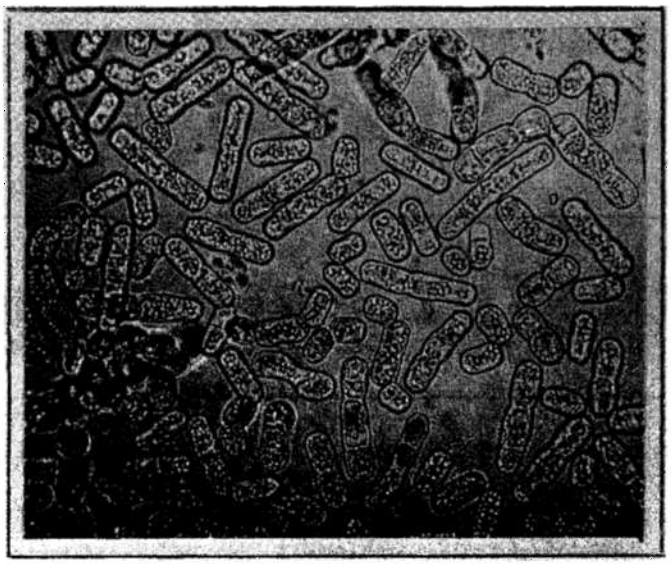

Fig. 1. The Alga Stichococcus subtilis separated into individual cells which can be distributed by the wind.

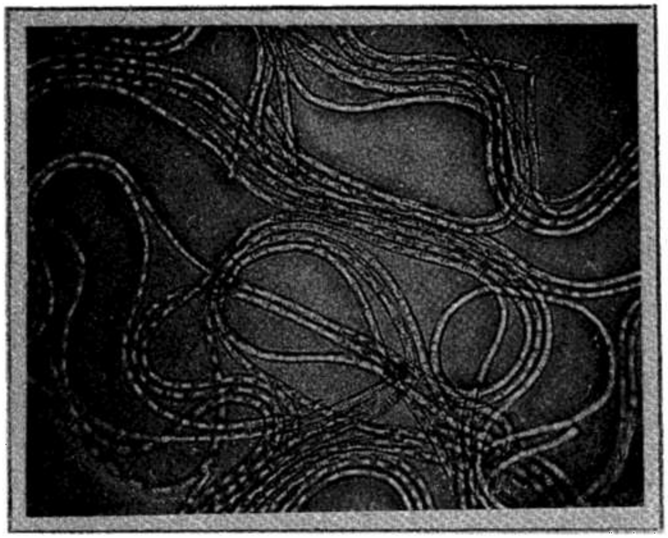

Fig. 2. Masses of threads of Stichococcus subtilis cells that grow from smaller fragments and plug ventilators.

Illustrative of the clogging action of these organisms is Stichococcus subtilis. This organism is a common inhabitant of the soil and grows in long threads of cells. Under some conditions these threads break up into individual cells or small groups of two or more cells. The alga can withstand drying and the single cells or groups of cells (Fig. 1) can be carried with the dust. As soon as they alight in a moist place, as the wet packing of a cooling filter they start to grow. All live cells in a chain can divide and grow and multiplication is very rapid, the length of the threads increasing many fold in a week or ten days. Long tangled chains of cells result as illustrated in Fig. 2. It can be seen how easily such masses could clog the spaces of the cooling filter.

These algae have the characteristics of other green plants and are readily killed by copper or mercury compounds, but these chemicals in time might have an injurious effect on the pump and valves of the cooler system. Other chemicals such as 2-4-D would destroy the algal growth but the effect of the fumes on the greenhouse crop would prohibit their use.

Other compounds are being used which suppress the algal growth but are not injurious to the crop plants. "36-20" disinfectant /2 is an example of such a compound. In a series of tests of this material, Pyrex flasks containing a nutrient solution were infested with approximately 8000 algal cells per flask. "36-20" was added to one set of these flasks at the rates of 1, 10, 50, and 100 parts per million respectively. After three weeks the untreated cultures and those with 1 ppm. "36-20" were very green with algal growth. No algal growth occurred in flasks with 10, 50, and 100 ppm. The treated algal cells lost their green color, became white and translucent, and staining indicated they were dead. The smaller cells agglutinated together and bacteria massed about the dead cells. In a duplicate set of flasks the algae were grown for 15 days, at which time a good growth was visible. "36-20" was then added to these cultures in the same amounts as above. Within a week the flasks given 100 ppm. were completely cleared of algae. Those given 50 and 10 ppm. were partly cleared, while the algae in the untreated flasks and those with 1 ppm. continued good growth.

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/2 "36-20" disinfectant is marketed by Nu-Tone Products Co., Denver, Colorado for general disinfection uses, especially around food materials. "36-20" contains 10 percent para di-isobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride as the active ingredient.

Your editor,
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