Understanding The Effect of Algaecide Application's Timing on Early Algae Infestation in California Rice Production

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Introduction

- Controlling early algae infestation in the beginning of the season is critical for maintaining rice seedling emergence and establishment
- Copper sulfate in the form of "Blue Stone" is consistently used when algae bloom is observed
- The efficacy of copper sulfate for controlling algae could be influenced by the rate, time and form of its application;
- Study on the effect of algaecide application's timing is required to fill this gap of knowledge;

Objective

To evaluate various algaecides and their timing and to understand under which algaecide treatment rice has the best establishment.

Materials & Methods

- Study was conducted in the Rice Experiment Station in Biggs, CA during Summer 2020;
- Plot size: 10x10 feet;
- Experimental design: split-plot with three replicates;
- Algaecide treatments (sub-plot): Algimycin, Cutrine-Plus, Cutrine-Ultra, copper sulfate (in both dry and liquid form), hydrogen peroxide and hydrothol-191;
- Algaecide application time (main plot): at planting day, seven days after planting;
- Permanent quadrats were placed in each plot and rice seedling emergence were followed during the experiment (rice variety M-206);
- Algae infestation was scored visually (0-100) at 2, 7 and 14 days after algaecide treatment (DAT);
- Data were analyzed in SAS ver. 9.4 using Proc GLM procedure and the comparisons between treatments were subjected to Proc Lsmeans

Figure 1. Overview of the experimental set up with permanent quadrats

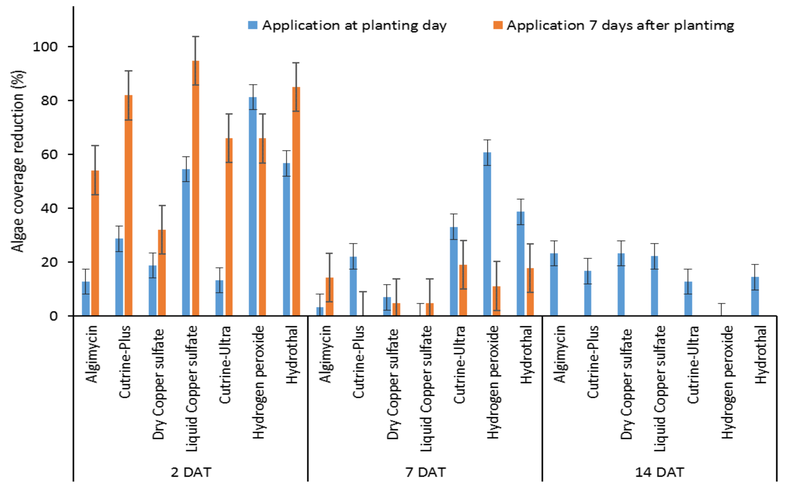

Figure 2. Algae coverage reduction (%) for algaecide applications. Algaecide were applied at planting day and 7 days after planting. Visual algae coverage was recorded at 2, 7 and 14 days after algaecide treatments (DAT).

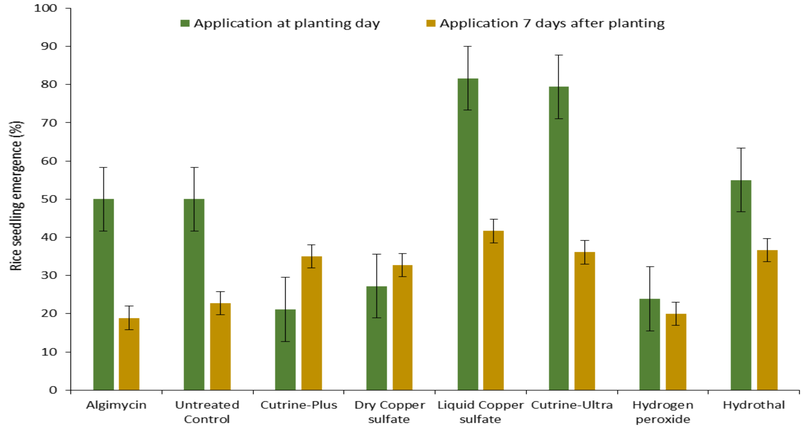

Figure 3. Total rice seedling emergence (%) under different algaecide treatments and algaecide application time (application at planting date and seven days after planting).

Results & Discussion

- Maximum algae reduction occurred at 2 DAT for both application timing;
- Hydrogen peroxide (80%), Hydrothal (68%) and liquid copper sulfate (65%) showed the highest algae reduction when they were applied at day of seeding;
- Whereas liquid copper sulfate, hydrothal and Cutrine-Plus controlled algae more than 80% when they are applied seven days after planting;
- The percentage of rice seedling emergence was higher when algaecides applied at planting day than the application of algaecides a week after planting;

Conclusion & Future Work

- Algaecide application at day of rice planting seems to be a better option for algae control in rice;
- Liquid form of copper sulfate can effectively reduce algae infestation;
- Late application of copper sulfate may cause injury to rice seedlings and less establishment as the consequence;
- Future studies will be focused on repeating the experiment to investigate the cause the cause of injury

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USDA ARS United States Department of Agriculture Agricultural Research Service

Rice Experiment Station Est. 1912