FIELD TRIAL SUMMARY

COLONEL™ XTR

For control of all algae types.

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TRIAL OBJECTIVE

To evaluate Colonel™ XTR for the control of filamentous algae.

Materials and methods

Table 1: Treatment protocol

Treatment Number	Herbicide	Rate
1	Untreated control	0 ppm
2	Colonel XTR	0.2 ppm
3	Colonel XTR	0.4 ppm
4	Colonel XTR	0.6 ppm
5	Colonel XTR	0.8 ppm
6	Captain® XTR	0.6 ppm

- All treatments were applied via in-water injection to 900ml of de-chlorinated tap water on October 13, 2022.
- Filamentous algae mat material dominated by *Mougeotia* sp., *Oedogonium* sp., and *Spirogyra* sp. were field collected and allowed to establish in the greenhouse for two weeks. Even aliquots of mat material were placed in 1 liter glass mesocosms filled with de-chlorinated tap water. Healthy actively growing algae was confirmed in each vessel prior to treatment.
- Average water temperature and pH on the day of treatment was 25.2 °C and 8.02, respectively. This method of application closely aligns with herbicide application methods utilized in the field. All treatments listed in table 1 were applied with a static exposure scenario. Treatments were replicated six times utilizing a randomized complete block design.
- A percent injury rating was recorded and imagery was collected for each treatment vessel at one, four, seven, and fifteen days after treatment (DAT). At 15 DAT, all algal mat material was harvested and representative macroscopic and microscopic imagery was collected. Microscopic visual assessment was used to confirm macroscopic ratings. Excess water was removed from algal material utilizing paper towels. The material was then allowed to air dry for 48 hours prior to being placed in an industrial dryer and dried at 60°C to constant mass. The dry biomass for each replicate was recorded following this drying period.
- Results were analyzed utilizing ANOVA followed by Tukey HSD, where appropriate.

Trial results and conclusions

- Colonel XTR reduced algae similar to Captain® XTR.

Untreated control replicates remained healthy throughout the trial. Injury ratings appear to be correlated to the rate of Colonel XTR applied, with 0.8 ppm showing the greatest percent injury (93 ± 4%) and 0.2 ppm showing the lowest percent injury (23 ± 3%) at 15 DAT (Figure 1). The greatest increase in visible injury for all treatments occurred between 24 HAT and 4 DAT. Beyond 4 DAT the increase in visible injury was more limited, particularly for the treatment with 0.2 ppm of Colonel XTR (Figure 1). *(continued on back)*

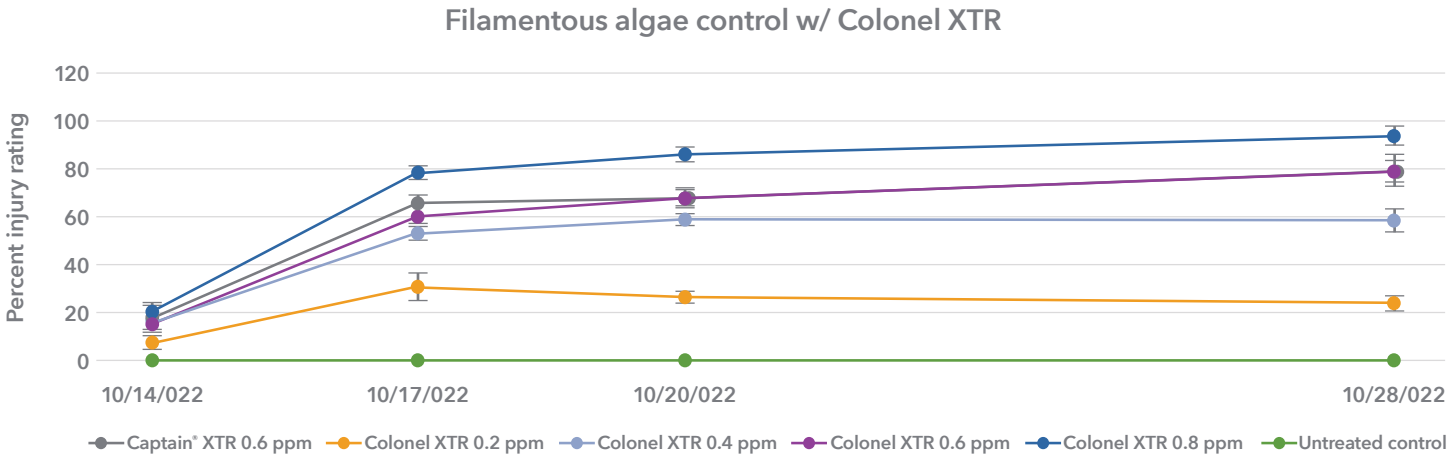

Figure 1: Filamentous algal percent injury response to copper treatment over time. Points represent the mean values and error bars represent the standard error.

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(Continued from front) Treatment with Colonel XTR at 0.6 ppm and treatment with Captain XTR at 0.6 ppm largely followed a similar injury pattern over time (Figure 1). At 15 DAT, all treatments had exhibited significantly higher percent injury than the untreated control (Figure 2). Injury ratings for algae treated with Colonel XTR at 0.6 ppm, Captain XTR at 0.6 ppm, and Colonel XTR at 0.8 ppm did not differ statistically from one another (Figure 2). Treatments with Colonel XTR showed incremental increases in injury with increases in application rates (Figure 2). Filamentous algal biomass measurement told largely the same story as injury ratings at 15 DAT; however the differences between treatment groups were not statistically significant. In fact, only the treatment with Colonel XTR at 0.8 ppm differed statistically from the untreated control and Colonel XTR at 0.2 ppm. This lack of statistical variation is likely due, in part, to the remaining empty cells and sheaths (Figure 4). These empty cells will break down eventually, resulting in lower biomass measurements, however, they had not yet broken down at the conclusion of the experiment. Overall, these results indicate good control of filamentous algae with Colonel XTR at rates above 0.6 ppm, and comparable control to Captain XTR at 0.6 ppm.

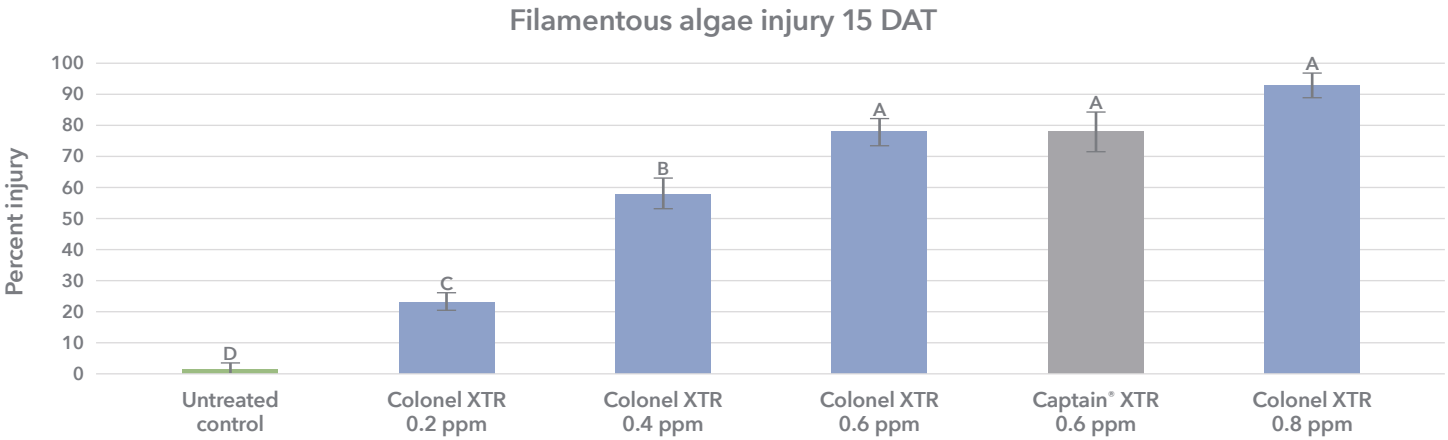

Figure 2: Filamentous algal percent injury response to copper treatment at 15 DAT. Bars represent the mean values and error bars represent the standard error. Bars sharing a letter did not statistically differ in ANOVA with Tukey Kramer Post Hoc analysis.

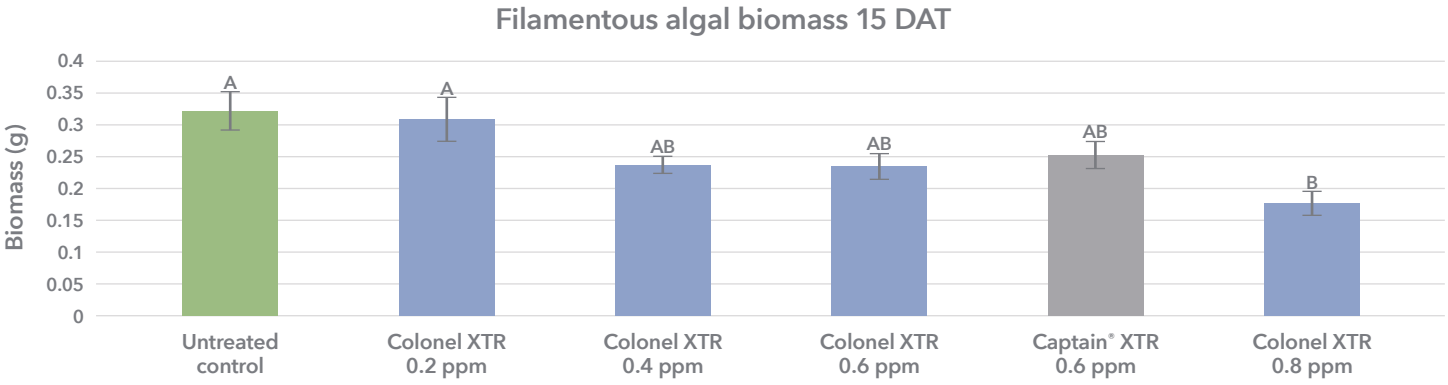

Figure 3: Filamentous algal biomass response to copper treatment at 15 DAT. Bars represent the mean values and error bars represent the standard error. Bars sharing a letter did not statistically differ in ANOVA with Tukey Kramer ost hoc analysis.

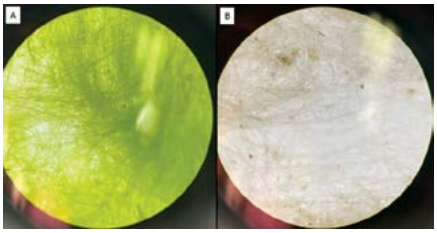

Figure 4: Filamentous algae before (A) and after treatment (B) w/ 0.8 ppm Colonel XTR. Cell death is apparent in B.

See label for complete application guidelines and restrictions.

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