

Reduce Transpiration With the Use of Misters to Increase Plant Health and Productivity

BY BRITIN VAN BROCKLIN

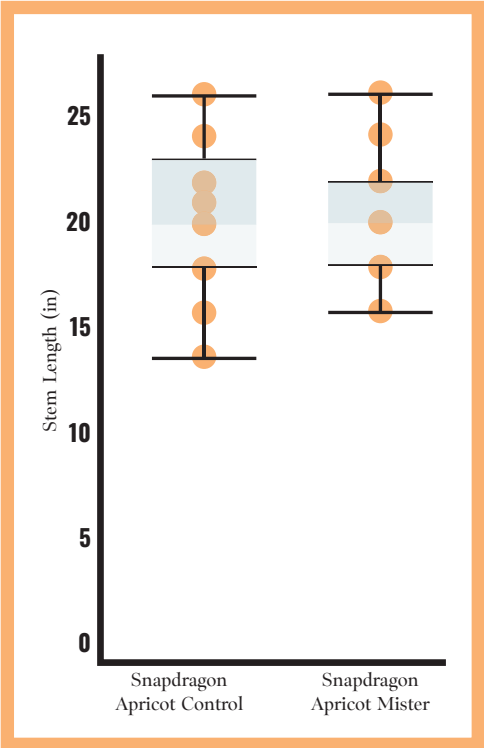


Growing flowers in northern Utah can be challenging because of the amount of intense sunlight we receive during the summer months, especially for cool-season crops like snapdragons. Going from a cool spring to hot summer temperatures can happen in a very short amount of time. This project used misters to help combat the stress of those high temperatures. Cool-season 'Chantilly' snapdragons were chosen because they are popular flowers for florists, do not ship as well as other flowers, and tend to stop flowering well when the weather heats up.

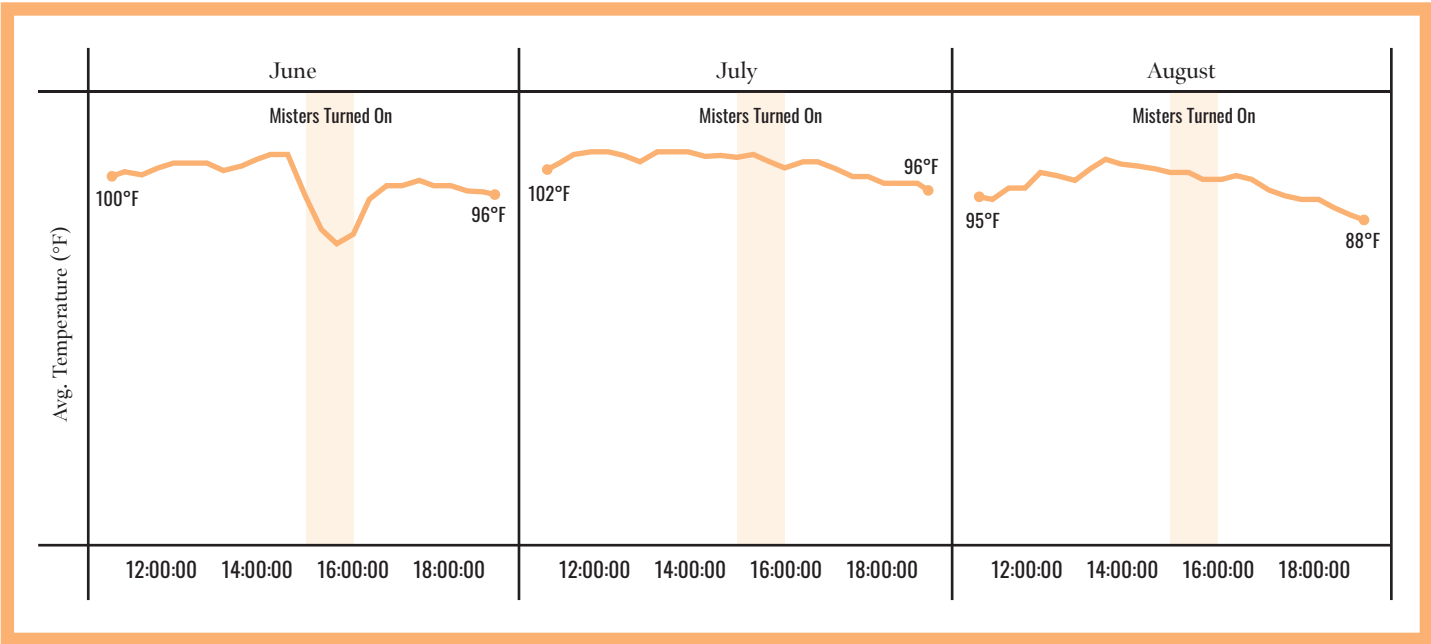
The purpose of the misters is to effectively cool air temperature enough to produce a microclimate. The microclimate may also help to increase the period of time that the crops are blooming further into the summer season. This could help with the investment of planting and establishing the plants with less need for successions. Healthy plants may also produce more blooms and stems per plant, which would increase the profitability of the plants.

The use of misters has been studied on cauliflower crops and has been found to reduce the average temperature in the mist plots by 4.8°F (1). As well as a reduction in temperature, it has been reported that as the misting cools the air, it reduces the transpiration rate (2).

In studying the use of misters in a greenhouse setting, it was reported that the increase in water vapor resulted in an increase in solar energy absorption in the atmosphere and an additional reduction in plant heating.



The misters were set four feet above the ground.



The misters reduced the air temperature around the plants during the time they were running, thus helping to reduce transpiration during the hottest part of the day.

Research Procedure

Our project was established in spring 2024 by planting 'Chantilly Light Salmon' snapdragons. The project consisted of two groups:

Group 1: 100 snapdragon plants with misters placed 4 feet above the ground, over the plants. **Group 2:** 100 snapdragon plants with no misters were the control group.

An irrigation and mister schedule was implemented with the misters running daily from 3 p.m.–4 p.m. during the hottest part of the day. Drip irrigation ran on average three times a week.

Air temperature data loggers were placed under the misters in June at a distance of two feet above the ground. Data was collected with temperature data loggers via Bluetooth and sent to a mobile device.

The misted snapdragon plants were then compared to the control group plants through the growing season by comparing stem length. We also observed the overall plant health.

Observations/Results

Plants began to bloom beginning the first week of June. The chart below shows the stem-length data from the first week of June to mid-July. In mid-July, the snaps continued to produce blooms but on short, thin, unmarketable stems.

Stem length was similar, and statistically there was not a significant difference, but when observing the plants in each of the groups, the overall look and health of plants with misters seemed healthier and less susceptible to diseases like powdery mildew.

We are happy that our project shows the success of reducing air temperature from misters. We did notice that by July, the misters would clog and it was hard to get them to run correctly.

Recommendation

We recommend running misters for a longer duration during the hotter months of the season to help reduce the heat stress for a longer period and to help keep stems tall and thick. We also recommend purchasing a mister kit that has a removable/replaceable filter so as the summer continues and misters get clogged you can quickly fix the issue.



Notes: *Orlaya* was originally going to be tested alongside the 'Chantilly' snapdragons, but we received mislabeled plugs and were unable to study them.

References

- Spears, Jerry Lee, "Mist Irrigation for the Improvement of the Climate for Cool Season Crops" (1967). *Electronic Theses and Dissertations*. 3336. <https://openprairie.sdstate.edu/etd/3336>
- Gazquez, J. C., Lopez, J. C., Baeza, E., Saez, M., Sanchez-Guerrero, M. C., Medrano, E., & Lorenzo, P. (2006). Yield response of a sweet pepper crop to different methods of greenhouse cooling. *Acta Horticulturae*, (719), 507–514. <https://doi.org/10.17660/actahortic.2006.719.58>
- Langhans, R. W. (1957). *Some effects of intermittent foliar water applications on the physiology of plants and the growth of greenhouse roses*. Cornell University.

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