Shadehouses with photoselective nets featured in study of growing conditions

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Shade nets are widely used in ornamental crop production systems to protect crops from radiation, wind, hail, and birds. According to a 2011 study from the United States Department of Agriculture, 43% of floricultural crop production in the United States occurred under shade or other temporary cover. Although black nets are most common, growers have begun experimenting with colored, gray, and white "dispersive" netting in order to determine effects of the colored nets on crop vigor, dwarfing, branching, leaf variegation, and flowering time. Researchers from the University of Florida's Mid-Florida Research and Education Center published results of a 12-month research study in *HortScience*, in which they evaluated light quantity, light quality, and other environmental variables inside shadehouses fitted with photoselective and color-neutral nets. They anticipate that their study findings will be helpful to growers, horticulturists, and agricultural engineers.

According to author Steven Arthurs, today's photoselective (colored) and color-neutral dispersive shade nettings are made of woven or knitted polypropylene materials with different dimensions of fibers and holes designed to create specific shade levels. "Traditional black nets are completely opaque, and the spectral quality of radiation is not modified by the nets, while dispersive shade nets are less opaque and scatter radiation, creating more diffused light that can penetrate inside plant canopies, Arthurs explained, adding that colored nets contain additives that selectively filter solar radiation to promote specific wavelengths of light."

The researchers designed a study using 16 shadehouse structures that were covered on the top and all sides with one of two photoselective (red and blue), or one of two color neutral (black and pearl) nets. "This setup allowed us to monitor the impact of the full spectrum of environmental conditions (not just light) independently," said Arthurs. The researchers then took light measurements monthly.

"We found that all shade nets reduced PAR compared with uncovered sites, but there were differences between colors," the scientists said. "Observed PAR values were reduced most under black nets and least under red nets with blue and pearl nets intermediate. Our results showed that photosynthetic shading values were black (55% to 60%), blue (51% to 57%), pearl (52% to 54%), and red (41% to 51%), depending on the season."

The research team examined the effects of the shade nets on other environmental variables as well. Average daily maximum air temperatures were higher inside shadehouses with colored nets compared with black nets or ambient. Highest air temperatures were recorded under red, while black nets were consistently cooler. Blue and pearl recorded similar temperatures, and were intermediate between red and black nets.

"Our study documents the different environmental modifications inside structures covered with black and colored nets, which will help predict or interpret specific plant responses," the authors said. "However, a review of the literature suggests that the responses of different plant species to modified light conditions are often variable."

More information: hortsci.ashspublications.org/c … nt/48/8/975.abstract

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