COGONGRASS: GREEN IS GREEN AND RED IS RED, OR ARE THEY?

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INTRODUCTION

Cogongrass [*Imperata cylindrica* (L.) Beauv.] is an aggressive perennial grass that is considered to be the world's seventh worst weed (Holm et al. 1977). This non-native invasive weed is native to tropical and subtropical areas of the eastern hemisphere, but has spread to all continents except Antarctica (Brown 1944; Hubbard 1944). Cogongrass spreads by seed and underground horizontal stems or rhizomes. Several thousand ha are infested in the southeastern United States and more than 0.6 billion ha worldwide (Holm et al. 1977). Cogongrass continues to spread at an alarming rate. For instance, since 1979, the number of cogongrass infestations increased from sites in 19 Mississippi counties (Patterson et al. 1979) to at least one site in 50 of Mississippi's 82 counties (Byrd and Bryson 1999; unpublished data).

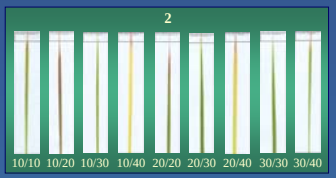
Unfortunately, some nurseries have sold cogongrass cultivars with reddish foliage as ornamentals. According to taxonomic studies, these ornamentals are the same species as the biotypes that cause major weed problems worldwide (Gabel 1982) and do not bloom. Several ornamental manuals provide warning statements to immediately remove these if they become invasive (Bryson and Carter 1993). Because reddish leaf color was observed during the fall in weedy cogongrass patches, we hypothesized that leaf color could be manipulated by differing temperatures regimens. Our objective was to determine if cogongrass leaf color was dependent on temperature regimes.

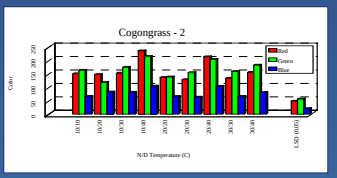
MATERIALS AND METHODS

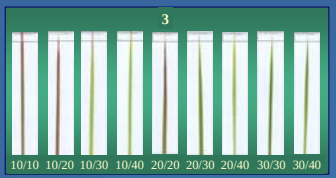
The following cogongrass collections were evaluated for leaf color in differing temperature regimes: 2 - Askikalak, Iraq; 3 - Mobile, Alabama; 7 - Basrah, Iraq; ALA-CAM - Camden, Alabama; MS-2 - Picayune, Mississippi; MS-3 - McNeil, Mississippi; and Red-1 - a red cultivar obtained from a bonsai garden in Ann Arbor, Michigan in 1986.

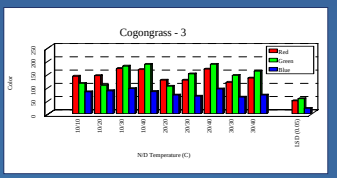
Plants were maintained from rhizomes in a greenhouse [25/35 C night/day (N/D)] at Stoneville, MS, in 12-cm diameter pots in a mixture of a Bosket sandy loam (Mollic Hapludalfs) soil and Jiffy Mix at 50/50 v/v. Plants were transferred into growth chambers for two weeks prior to data collection. Growth chamber experiments were conducted at temperature regimes of 10/10, 10/20, 10/30, 10/40, 20/20, 20/30, 20/40, 30/30, and 30/40 C N/D.

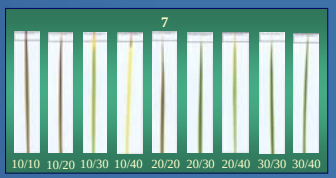
Plants were in growth chamber environments for 2 weeks prior to leaf collections. A digital library of leaf images was established and maintained for each cogongrass biotype and temperature regime. Leaf color (red, green, and blue) was determined with Computer Image Analysis System software and data were converted to percentage of an untreated check maintained at 20/30 C N/D.

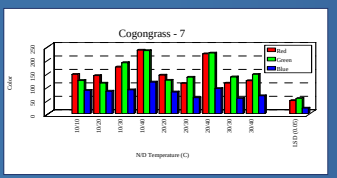


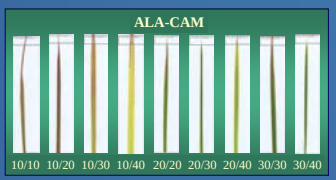


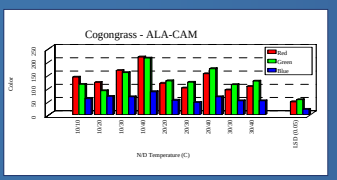


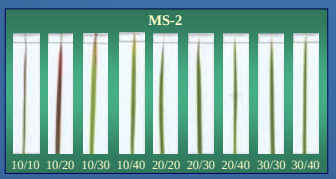


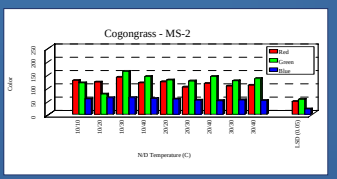


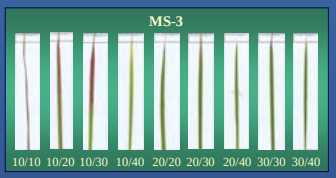


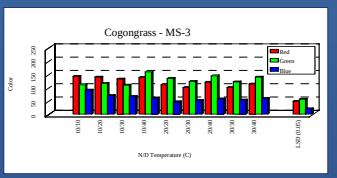


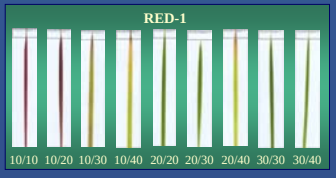


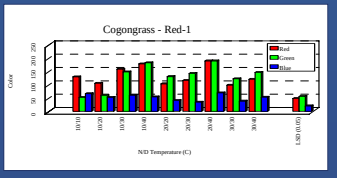












RESULTS

Leaf color changed among temperature regimes for each of the cogongrass collections; however, degree of color change varied among collections. At lower temperatures, Red-1 was red, but turned green at 30/30 and 30/40 C. Weedy cultivars were green at the higher N/D temperatures and all turned red to varying degrees at the lowest night temperature (10 C) or at the greatest N/D temperature differences (10/40 and 10/30 C N/D). These studies demonstrated that leaf color in cogongrass is temperature dependent and that at least one red cultivar turned green and that all green weedy biotypes turned red under stress, especially during warm days and cool night temperatures.

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Red Baron Cogongrass bought from K-Mart in 2000.