TRANSFERRING DISEASE RESISTANCE FROM COLONIAL TO CREEPING BENTGRASS

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Many wild related species in the same genus are a fruitful source of alien genetic material that can be used to improve modern cultivars and broaden their genetic base (Singh, 2001). The introgressions of alien genes or chromosome segments conferring economically important traits, such as disease resistance or quality were practiced in many crops (C.R. Linder et al, 1998. Multani et al, 2003. Janssen et al, 1997). In wheat, a powder mildew resistance gene *Pm21* was transferred from wheat wild related specie which contributes high and broad resistance to disease (Qi et al, 1996). To transfer chromosome fragments carrying the desirable genes between species, the F_1 hybrids were obtained by interspecific cross, and chromosomes of F_1 were doubled for fertilizing. Then hybrids were subject to backcross with current parent for producing chromosome additional lines. After several generations of backcrossing, selfing, inducing mutations and resistance evaluation, the alien fragments may be stably inherited and shortened (Shi et al, 1998). Because of instability of alien fragments in early generations, these fragments should be monitored by cytogenetic (Banding, GISH and FISH) (Dubcovsky et al, 1998, Wang and Bughrara, 2003, Chen et al, 1999) and molecular marker techniques (RFLPs, SSRs) (Qi et al, 1999, Wang et al, 2003).

Because creeping bentgrass cultivars are not resistant to both dollar spot and gray snow mold. The objective of this research is to utilize the resistance from colonial bentgrass to improve creeping bentgrass disease tolerance.

Production and characterization of interspecific hybrids of colonial and creeping bentgrass

Creeping bentgrass (*Agrostis stolonifera* L. 2n=4x=28 genome $A_2A_2A_3A_3$) is commonly used in golf course, putting green, tees and fairways, but commercial cultivars are highly susceptible to various fungal pathogens such as dollar spot (*Sclerotinia homeocarpa*), gray snow mold (*Typhula incarnate*), and brown patch (*Rhizoctonia solani*). Colonial bentgrass (*A. capillaris* L. 2n=4x=28 genome $A_1A_1A_2A_2$), a related species, shows have good resistance to dollar spot and snow mold. To improve creeping bentgrass disease resistance, interspecific hybrids between creeping bentgrass and colonial bentgrass were produced for introgression of resistance genes. The hybrids (2n=28) were confirmed by species-specific sequence characterized amplified region (SCAR) marker of the colonial bentgrass genome. In addition, chromosome pairing at meiosis revealed approximate seven ring bivalents and some univalents and multivalents. Pollen fertilities of the hybrids ranged from 4% to 34.5%. The hybrids were evaluated for gray snow mold resistance in the cold room and dollar spot resistance in the greenhouse. Some of them have excellent dollar spot resistance, exhibiting significantly diminished disease symptoms.