

Recovery from Winter Injuries Using Seed Priming and Protective Covers

Kun Jia, Scott Ebdon, and Michelle DaCosta

Low soil temperature is a major limiting factor affecting seed germination, which can significantly delay turfgrass establishment and cover in spring months. Specific management practices may enhance establishment under sub-optimal environmental conditions, including the raising of soil temperatures using covers or darkening agents and priming of seed to speed the germination process. Seed priming is a method that consists of pre-soaking seed in a solution prior to planting, and has been shown to improve seed performance by reducing the time to germination, improving seedling emergence, and increasing the uniformity of germination under adverse conditions. Various compounds could be used as potential priming agents, including water alone (hydropriming) or compounds dissolved in water such as plant hormones (e.g. abscisic acid, gibberellic acid), osmotic solutes of low water potential (e.g. polyethylene glycol, glycine betaine), and reactive oxygen species (e.g. hydrogen peroxide). To date, there is little information on the use of seed priming techniques to enhance seed germination and establishment in turfgrasses, particularly at low temperatures. Therefore, the primary objective of our study was to examine the effects of different priming agents and covers on germination and establishment traits of Penncross creeping bentgrass. In an initial study using growth chambers, we tested six different priming solutions varying in concentration, including water, hydrogen peroxide, polyethylene glycol, glycine betaine, abscisic acid, and gibberellic acid. Based on results from these controlled environment studies, we selected water and glycine betaine as the priming treatments for the field study. To increase soil temperatures, we selected geotextile covers of different colors and weights to provide varying levels of heat absorption into the soil, including an Original Evergreen cover (Hinspergers Poly Industries), DeWitt 1.0 oz Deluxe Plus Germination Blanket, and DeWitt 2.5 oz Thermal Blanket, as well as an uncovered control. Soil temperatures were monitored daily using data loggers, and germination and cover were assessed weekly. The effects of priming and covers on germination traits will be discussed.