

# ALLELOPATHIC EFFECTS AND REMOVAL OF OVER-SEEDED RYEGRASS ON BERMUDAGRASS

Brad S. Fresenburg  
Dr. Reid Smeda, Dissertation Supervisor  
ABSTRACT

Allelopathy is a complex phenomenon among plants that involves the production of defensive chemicals that influence the growth and survival of adjacent plants. Plants like perennial ryegrass become suspect when bermudagrass (*Cynodon spp.*) cover is reduced by 88% when seeded into perennial ryegrass.

Over-seeding bermudagrass with ryegrass (*Lolium spp.*) is a common cultural practice on golf courses and athletic fields in late summer as bermudagrass becomes dormant. In spring, removal of ryegrass is essential for bermudagrass recovery or decline of bermudagrass is inevitable. However, underlying reasons for this decline is unknown.

Objectives of this research were to assess allelopathic effects of ryegrasses on bermudagrass and determine best management practices for spring removal of intermediate (*Lolium multiflorum* Lam. x *Lolium perenne* L.) and perennial ryegrass by cultural practices and herbicide applications.

Cultural practices (mowing and fertility) reduced intermediate ryegrass stand by 10% when mowing height was decreased and urea fertilizer was added. Mowing height and fertilizer applications, alone, are not sufficient in the removal of improved perennial ryegrasses.

Herbicide treatments (chlorsulfuron, rimsulfuron, metsulfuron, trifloxysulfuron, foramsulfuron, and sulfosulfuron) resulted in rapid reductions (> 95%) of all ryegrass cultivars. All herbicide treatments enhanced bermudagrass recovery.

In vitro agar-assays with ryegrass water extracts reduced bermudagrass seed germination by 62%. Fractionation of soluble allelochemicals by HPLC confirmed inhibitory activity on bermudagrass seed germination from 37 to 0%.

While cultural practices alone may not be enough to remove perennial ryegrass, chemical removal of ryegrasses may be too rapid for a smooth spring transition. Identifying allelochemicals in ryegrass could lead to the development of natural bermudagrass herbicides.