Prevent turf disease with manganese

Since the 1980s it has been known that applications of manganese can decrease the severity of diseases caused by the fungus *Gaeumannomyces*. Though the original research was done on diseases of wheat, PACE Turf has applied those findings to turfgrass diseases, such as take-all patch and decline, with good results.

Larry Stowell, Ph.D., PACE Turf's agronomist and plant pathologist, says that to achieve disease suppression of take-all patch, he recommends that soils contain a minimum of 30 ppm (parts per million) manganese (when analyzed using Melich III extraction). Iron should be present at three times the level of manganese. "At least 90 ppm iron is desired if you are targeting 30 ppm manganese," Stowell says. "Products that are effective in delivering manganese are Granusol Mn (a granular 31% manganese product) and manganese sulfate (which can be applied as a granular or as a spray, 30% manganese). To maintain soil manganese levels at a minimum of 30 ppm, apply either product at 100-200 lbs/acre watered in following application. The 100 lb/acre rate will increase soil manganese by about 15 ppm. Quarterly applications at this rate (equivalent to 2.3 lb/1000 sq ft) may be necessary in some locations to keep the manganese at 30 ppm in the soil, but be careful—too much manganese can also be a problem."

PACE Turf's other lead turf researcher, Wendy Gelernter, Ph.D., says, "Please keep in mind that manganese (Mn) is a whole different animal than magnesium (Mg), with which it is frequently confused."

How does manganese damage the disease-causing fungal organism? Gelernter says, "Ian Thompson and his colleagues at Purdue University are working with take-all of wheat (which is closely related to take-all patch and decline diseases). They've found that the fungus causes some of its damage by converting manganese, an essential plant nutrient, into a form that the plant cannot use. When extra manganese is applied to turf in the form of Granusol manganese or manganese sulfate, the plant gets another chance to grab some of this important mineral before the fungus gobbles it up."

The Purdue researchers also made a finding that has great potential in turf management: the fungus that causes gray leaf spot, *Magnaporthe grisea*, may disable manganese in the same way as the take-all fungus does. Stowell says, "If this proves to be correct, then it may be possible to prevent some gray leaf spot damage through preventive applications of manganese, as well."

For more specific information on manganese requirements, see PACE Turf's soil management guidelines at www.paceturf.org. Additional turf management topics are available to members of PACE Turf. Free trial memberships are also available at the website.

PACE Turf is a membership organization that provides research, education and information services to the turf management community. Founded in 1993 by Wendy Gelernter, Ph.D. and Larry Stowell, Ph.D., the PACE Turf mission is to generate and share independent and objective agronomic information among turf professionals so they may develop management programs that are effective, practical and scientifically sound. ■