

SOIL REFERENCE



Soil Manganese (Mn⁺⁺)

Manganese is an essential element for plant growth and plays a key role in photosynthesis and other critical pathways in the plant. Manganese can substitute for magnesium in some reactions in the plant.

The role of manganese in IPM

Manganese has been found to suppress take-all patch caused by *Gaeumannomyces graminis* on bentgrass. Target levels of manganese are dependent upon soil pH and can be calculated using a manganese availability index value of 110 in the equation below: (use Mehlich III extracted manganese values)

$$\text{Manganese Availability Index (MnAI)} = 101.7 - 15.2 (\text{pH}) + 3.75 \text{ Mn mg/kg}$$

For optimum turfgrass performance, manganese and iron levels should be balanced at a ratio of 3:1 iron:manganese reported as Mehlich III extracted mg/kg. Although there has been no observed toxicity for manganese levels above the 30 – 45 ppm range reported in the guidelines below, excessive manganese application is not encouraged.

Guidelines

	Low	Normal	Excessive
Mehlich III SLAN	< 30 mg/kg	30 - 45 mg/kg	unknown
MnAI	< 110	> 110	unknown

Management

Manganese products that can be used to adjust soil manganese levels are listed below.

MnSO₄*H₂O Manganese sulfate

Manganese sucrate Granusol manganese