



Best Management Practices for New York State Golf Courses

Phosphorus Management Checklist

Soil Issues

- Phosphorus fixation increases with increasing clay content in the soil. The larger amount of surface area associated with clayey soils and the Al-Fe minerals in the lattice help adsorb more P than other soils. In calcareous soils, the adsorption is associated with calcium carbonate (CaCO_3).
- Larger fertilizer additions are required to maintain a level of plant available P in finer soils compared to that in coarser, sandy soils. The risk of leaching P is highest in sandy soils.
- The rate of biological activity, and therefore P mineralization, increases with increasing temperatures. Fertilizer applications should only be applied to active soils when soil temperatures are above 50°F.
- Liming acid soils increases the P solubility in acid soils, but over-liming can reduce P solubility. Sorption also occurs to calcium cations (Ca^{2+}) but only at pHs up to 6.5. At higher pH values, Ca-P precipitates form.
- Incorporating P into the soil when possible increases adsorption and reduces the amount of plant available P. Broadcasting P fertilizer on the surface leaves the fertilizer susceptible to runoff.

Plant Issues

- Returning clippings to the turf is a practical method of returning organic P back to the soil. Clippings may account for 0.10 to 0.35 lbs P per 1000 sq ft. If clippings are removed, the loss of P depletes available P for plant uptake.

Other Sources Issues

- Foliar applications at light rates may increase plant uptake. Unabsorbed foliar P, however, remains at risk for episodic losses due to runoff caused by heavy precipitation or excessive irrigation. A light irrigation after P fertilizer application has been shown to reduce P runoff.
- Phosphonate fungicides are chemically different from phosphonate fertilizers in that the fungicide provides a phosphite ion (H_2PO_3^-) having one less oxygen atom. Potassium phosphite, also labeled as mono and di-potassium salts of phosphorus acid, Aliette, and Chipco Signature are the most common examples of a phosphonate fungicides. No evidence suggests that the phosphite ion is used in the plants metabolism. Regardless, the amount of P supplied in any fungicide application is negligible.