



Minimizing Pesticide Impacts on Golf Courses

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Record-breaking high temperatures and lack of snow this winter caused anxiety for many superintendents utilizing winter cover systems. Fortunately, the warmer-than-normal temperatures beneath covers did not negatively impact most golf courses, as annual bluegrass greens and fairways across much of the Northeast Region survived the winter and snow mold disease pressure.

However, courses in northern areas that recently removed their covers may still have to deal with potentially lethal cold temperatures, but most managers are now able to focus on spring maintenance and the season ahead.

Many superintendents will be trying to manage their playing surfaces using less water, fertilizers and plant protectants. In many areas, the pressure to reduce chemical inputs, or eliminate them altogether, is increasing. Unfortunately, heavy pest and disease pressure combined with vulnerable turf species means very few golf facilities will be able to completely eliminate pesticides from their management programs. However, there are opportunities for managers to reduce their reliance on pesticides while still providing good playing conditions. The [Bethpage Project](#) at Bethpage State Park Golf Course in Farmingdale, N.Y. demonstrated the possibilities of low-input management but also showed that the transition from conventional management programs to low-input programs was difficult, especially for golf courses dominated by older turfgrass cultivars



Healthy turf is a welcomed sight this spring after many golf courses were battered by the two previous winters.

and annual bluegrass. During the Bethpage Project an interesting tool – i.e., the environmental impact quotient (EIQ) – was developed. The EIQ concept can be incorporated into any pest-management program and uses a simple formula to measure and compare environmental risks of different pesticides and pest-management systems.

Environmental impact quotient calculations are based on values assigned to pesticide active ingredients. The **EIQ values** are established based on the acute and chronic toxicities, secondary effects on nontarget organisms, solubility and other physical characteristics of an active ingredient. Once identified, EIQ values are used to calculate an EIQ field use rating that accounts for the amount of product applied. A higher EIQ field use rating indicates greater potential for environmental impact. The formula to calculate EIQ field use rating is:

$$\text{EIQ field use rating} = \text{EIQ value} \times \text{percent active ingredient} \times \text{application rate}$$

(pounds per acre OR pints per acre)

For example, consider two different fungicide active ingredients, propamocarb and mefenoxam. Propamocarb, with an EIQ value of 23.89, is commonly available in formulations of 66.5 percent active ingredient and often is applied at 2 fluid ounces per 1,000 square feet. Mefenoxam, with an EIQ value of 19.07, commonly comes in formulations of 21.3 percent active ingredients and often is applied at 1 fluid ounce per 1,000 square feet. The EIQ field use ratings for propamocarb and mefenoxam can be calculated as follows:

$$\begin{aligned}\text{EIQ field use rating (propamocarb)} &= 23.89 \times .665 \times ((2/16) \times 43.56) \\ &= 86.5\end{aligned}$$

$$\begin{aligned}\text{EIQ field use rating (mefenoxam)} &= 19.07 \times .213 \times ((1/16) \times 43.56) \\ &= 11.1\end{aligned}$$

The New York State Integrated Pest Management Program website provides a helpful [EIQ calculator](#).

This comparison illustrates the potential environmental impacts of both fungicides when applied at recommended rates. Similar comparisons can be made for herbicides and insecticides. Combining EIQ field use ratings with pesticide efficacy data, pest resistance management strategies and cost information can help managers select the most environmentally appropriate products for their program. Environmental impact quotient field use ratings can also be used to compare the environmental impacts of entire management systems. Managers interested in this tool and other reduced-risk chemical management programs for golf courses can find more information in the publication, [Reducing Chemical Use on Golf Course Turf: Redefining IPM](#).

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