



## Best Management Practices for New York State Golf Courses

### Pesticide Evaluation Tools

Models have been developed that combine multiple characteristics and give relative weighting or ranking of the potential risk of specific pesticides. These are briefly discussed below. For further information on pesticide evaluation tools, see:

- EIQ calculator: <http://www.nysipm.cornell.edu/EIQCalc/input.php>
- WIN-PST: <http://go.usa.gov/Kok>
- IRPeQ: <http://www.mddep.gouv.qc.ca/pesticides/indicateur-en.htm>

### Environmental Impact Quotient

The Environmental Impact Quotient (EIQ) was developed to rate the risk of pesticides to human health and non-target organisms. The EIQ value is derived from mathematically weighting all the risk factors into a quotient. The EIQ is multiplied by the rate of application and percent active ingredient to calculate the Field Use EIQ Rating (FUEIQ):

$$\text{FUEIQ} = \text{EIQ} \times \text{Rate (lbs/acre)} \times \%AI$$

The FUEIQ provides a measure of the weighted risk or toxicity of a pesticide expressed as a value per acre. Multiplying the FUEIQ by the number of acres treated provides a risk/toxicity rating for the treated area. Summarizing all applications in this manner provides a summation of risks/toxicity for the entire property over a period. Cornell provides an online EIQ calculator to compare FUEIQ results. A FUEIQ under 25 is desirable. Any value over 100 poses high risks to applicators and the environment. *The Cornell Guide for Commercial Turfgrass Management* lists the range of FUEIQs for the rate range on each pesticide registered for use in New York. The Cornell publication *Reducing Chemical Use on Golf Course Turf: Redefining IPM* describes the methodology to evaluate pesticide environmental toxicity using EIQ.

### Windows Pesticide Screening Tool

Windows Pesticides Screening Tool (WIN-PST) is an environmental risk screening tool developed by USDA-NRCS for pesticides. This tool uses site-specific information to evaluate the potential of pesticides to move with water and eroded soil/organic matter and affect non-targeted organisms.

The risk of pesticide contamination of either surface water or groundwater is mostly affected by the properties of the pesticide, the properties of the soil, and the amount of rainfall after application. Unlike the EIQ and GUS, WIN-PST can be tailored to site-specific soil conditions and management practices. The method uses standard soil properties provided by the NRCS data base or can be adjusted to site-specific soil factors that affect the movement of pesticides, such the depth of the root zone and

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the organic matter content. The environmental risk can also be evaluated based on anticipated weather (rainfall).

The following example illustrates how WIN PST can be used for golf course conditions such as a sand green. For this example, the soil is sand at a typical greens depth of 12 inches and the average organic content for the 12 inch profile is 1%, by weight. The pesticides were applied to the turf foliage under two rainfall conditions: low potential for rainfall and a high potential for rainfall. Appendix G of the NY BMP document contains the WIN PST risk screening for pesticide leaching for most pesticides registered in NYS for use on golf courses. Under the low rainfall potential scenario, most of the pesticides evaluated had a low or very low risk (four had a high/extra high) to humans (long term exposure as a drinking water source) and only one pesticide has a high or extra high risk to fish, even when applied to this very high leaching-groundwater contamination soil like sand. When applied under a high potential rainfall scenario, however, 15 pesticides had a high/extra high risk to humans, and 20 had high/extra high risk to fish.

Based on these result, one of the BMPs for this example is to only apply pesticides when the potential for rainfall is low. On sites where greens drainage is discharged near streams or near drinking water wells, extreme care needs to be taken if a pesticide application is needed during a period with a high potential for rain. Appendix G of the BMP document can be used to select pesticides that have a low risk even under these conditions.

## Pesticide Risk Indicator for Quebec

Quebec's Ministry of Sustainable Development, Environment, Wildlife and Parks developed the Pesticide Risk Indicator for Quebec (IRPeQ), a diagnostic and decision-making tool designed for the optimal management of pesticides. This tool has both a health component and an environmental component.