PMEP Pesticide Education Fact Sheet: Hazard vs Risk

Hazard vs Risk: Relevance to Pest Management Options

Hazard (or *toxicity*) is a measure of whether a pest management option can cause harm under some conditions or circumstances. Most pest management options—even nonchemical options—present some hazard(s).	*Risk* is the likelihood that a pest management option will cause harm. *Risk* depends on both the option's *hazard* and your actual *exposure* to it. Risk is rarely zero, but we can take steps to make it low by limiting our exposure to a hazard.

The "Risk Equation": *Risk* = *Hazard* × *Exposure*	
Thus, regardless of the hazard, risk can be low or high depending on our level of exposure to it.	
Example 1: (Pesticide)	If a pesticide can cause eye corrosion (*hazard*) but you wear goggles so it won't get in your eyes (*exposure*), the chances of harming your eyes (*risk*) will be low.
Example 2: (Nonchemical)	Hoeing or hand weeding can cause back strain (*hazard*). The more time you spend in these activities (*exposure*), the greater the chances of harming your back (*risk*).

Correcting Common Misconceptions about Hazard and Risk			
Risk ≠ Danger	Exposure ≠ Danger	Least Toxic ≠ Least Risk	Natural ≠ Safe
"Danger" implies a high likelihood of harm, whereas "risk" can be low (and even extremely low) if the hazard and/or exposure is low.	As we know from using everyday hazards such as cleaners and over-the-counter medications, some exposure is OK; our risk would be significant only if we allowed our exposure to be too high.	If Pesticide A is less toxic than Pesticide B but leads to greater exposure (e.g., due to application rate, method, placement, and/or frequency), it might pose more risk than Pesticide B.	Pyrethrums, which are natural insecticides from chrysanthemum flowers, are more toxic than many synthetic pyrethroids, which are man-made mimics of pyrethrums.

Assessing and Communicating Hazard, Exposure, and Risk

The standard for registering a pesticide for sale and use is that it "will not pose unreasonable *risks* to human health or the environment when used according to label directions." To meet this standard, EPA and DEC conduct *risk* assessments by requiring tests that measure *hazards* and *exposure*. For pesticide uses that meet this standard, the product label will indicate *hazards*, concerns regarding routes of *exposure*, and proper use directions to mitigate *risk*. This process is covered in more detail in the factsheet "Pesticide Registration."

With the exception of importing biological control agents, comparable risk assessments and communications—though important—are rarely employed for nonchemical pest management options.

Always read and follow the label when applying a pesticide. The label is the law.

Dec. 2020

Cornell Cooperative Extension
Pesticide Management Education Program

Pesticide Management Education Program (PMEP)
525 Tower Rd, CALS Surge Facility, Ithaca, NY, 14853
607-255-1866 psep.cce.cornell.edu