



Are Pesticides Risky?

By Dr. Jim Kerns, Associate Professor, Department of Pathology, University of Wisconsin - Madison

The turf industry is constantly under the microscope with regard to fertilizer and pesticide applications. This is most likely due to the fact that we cannot eat turfgrasses. If humans developed a rumen, then we might be allowed to apply chemicals to our hearts content. Another fundamental problem with the "general public" is they believe that turfgrass managers maliciously over apply fertilizers and pesticides. If they understood the business, I think it would be clear that golf course superintendents are extremely responsible pesticide and fertilizer applicators.

However, pesticides are designed to kill or inhibit the growth of a pest, i.e. fungus, weed or insect. No matter how "safe" the chemical is they still can be hazardous or risky. In order to determine how hazardous a chemical is, toxicity and exposure has to be accounted for. For example, gasoline is inherently toxic yet our exposure to gasoline is limited. A substance that has a high toxicity does not necessarily mean the product is going to kill or harm human beings. Chlorothalonil has an oral LD50 of 10,000 ppm when fed to rats, but only 3 mg of chlorothalonil applied to eyes of rabbits caused mild to severe eye irritation. Compare these values to those of aspirin, which has an oral LD50 value of 200 ppm when fed to rats! Once again the key is adding the toxicity value with the amount of exposure. Even though we commonly use aspirin as a pain reliever our exposure is still mild enough that it does not kill us. Please do take this the wrong way, we still cannot drink chlorothalonil it is not that safe!

The important question is why does chlorothalonil get such bad press? The LD50 value in rainbow trout populations is 0.25 ppm, so it is highly toxic to aquatic organisms. I'm sure you are wondering about exposure to fish and other aquatic organisms. Chlorothalonil is not very soluble in water and has a fairly high sorption coefficient, which helps to limit exposure to aquatic critters. Yet in some bodies of water, scientists have detected levels of chlorothalonil as high as 6.5 ppm. How did it get there? Chlorothalonil is a very common fungicide and recommended for controlling diseases in many different crops. For example, chlorothalonil is an integral component for managing diseases in potatoes especially late blight. Essentially enough chlorothalonil is applied throughout the world of agriculture that eventually some of the product is going to reach water bodies.

Pesticides are usually associated with cancer too. There are studies that link certain pesticides to dif-

ferent types of cancer. Many substances can be linked to cancer. Remember Bisphenol A, a product in plastic water bottles, has been associated with breast cancer. Or acetone, benzaldehyde, benzyl acetate, benzyl alcohol, camphor, ethanol, ethyl acetate, limonene, linalool, methylene chloride, apinene, gterpinene, and a-terpineol, all of these products are commonly found in cosmetics and are linked to cancer in some way. An interesting study done by researchers in Massachusetts found no link between pesticide applications in cranberry bogs near neighborhoods and increased breast cancer incidence. Their conclusion was exposure to pesticides and other carcinogenic compounds are so frequent that it is difficult to link cancer incidence to a single entity such as pesticide applications (1). Yes there are some pesticides that are known carcinogens, but exposure to these chemicals is likely minimal.

For instance, another study from Cornell University evaluated the inhalation risk to golfers of 15 commonly used pesticides. Six of these pesticides are considered as likely carcinogens which include: chlorothalonil, iprodione, mancozeb, oxadiazon, propiconazole and thiophante-methyl (3). When the researchers examined inhalation risk, they determined that long-term effects from the 15 chemicals tested were likely to be minimal. The authors came to this conclusion because the inhalation risk to adult golfers was negligible (3).

In a separate study conducted in Massachusetts, researchers examined the dermal exposure risk to golfers. In this particular study the researchers sent golfers, (probably themselves or their staff) out on a golf course at different times of the day. Then they

Sod Grown on Irrigated Sand

Growers and Installers of Fine Turf

Low Mow Bluegrass, Kentucky Bluegrass, Bentgrass & Fine Fescue

Central Wisconsin Sod

Coloma, WI • Robert Heath, owner

Phone: 715-228-4106 • Email: heath@uniontel.net

sampled their clothes, which were similar to tyvec suits, for pesticide residues (2). Basically the researchers discovered that playing golf early in the morning wearing shorts immediately after a pesticide application was when golfers are most susceptible to pesticide exposure (2). However, most of the samples they collected did not show significant pesticide residue on the testable clothes. This work indicates that golfer exposure is limited and may only occur under certain circumstances.

Finally, under the current pesticide labeling system it takes 10 years to bring a new pesticide to the marketplace. During these 10 years, the manufacturer has to determine the active ingredient is efficacious against the targeted pest. The manufacturer also undergoes exhaustive experimentation to determine the toxicology of the active ingredient, the rainfastness, and the activity on and within the plant and soil. Patent of the active ingredient occurs somewhere during this process, which only allows the manufacturer 7 to 17 years to make up their initial investment to bring the chemical to market. Currently chemical manufacturers spend about 270 million dollars to bring a new pesticide to the market! One of the arguments against agricultural chemical companies is they are not required to examine human health concerns in detail. How many multi-billion dollar businesses would attempt to bring a chemical to market if it was a known carcinogen?

Yes some of the older chemicals are likely carcinogens, but are we overly exposed to these chemicals from turf. I think this is the most important question. The papers I highlighted in this article demonstrate that pesticide exposure is likely minimal or not greater than other known carcinogens. The take home message is pesticides are risky, but if used properly the risk can be minimal.

References:

1. Brody, J.G., A. Aschengrau, W. McKelvey, R. A. Rudel, C. H. Swartz, and T. Kennedy. 2004. Breast Cancer Risk and Historical Exposure to Pesticides from Wide-Area Applications Assessed with GIS. *Environmental Health Perspectives* 112(8): 889-897.
2. Clark, J.M., R. Putnam, and J. Doherty. 2008. Determining

Golfer Exposure and Hazard to Pesticides. USGA Green Section Record, March-April: 21-24.

3. Murphy, R.R. and D. A. Haith. 2007. Inhalation health risk to golfers from turfgrass pesticides at three Northeastern US sites. *Environ. Sci. & Technol.* 41(3): 1038-1043.



syngenta

The TURF ESSENTIALS

Comprehensive disease control starts with the essentials.

Embrace a new agronomic philosophy and take control of turf disease with The Turf Essentials™ from Syngenta. This group of proven combination fungicides features an array of active ingredients and multiple modes of action that allow you to create outstanding conditions efficiently and effectively.

Contact Phil Spitz to learn more about The Turf Essentials.
Cell: 414-429-2015
phillip.spitz@syngenta.com

GCSAA
GOLD PARTNER

www.turfessentials.com

©2010 Syngenta Crop Protection, Inc., P.O. Box 18300, Greensboro, NC 27419. Important: Always read and follow label instructions before buying or using these products. The instructions contain important conditions of sale, including limitations of remedy and warranty. Concert®, Instrata®, Headway®, SuperWeatherSik®, The Turf Essentials®, and the Syngenta logo are trademarks of a Syngenta Group Company.