Atrazine in North Carolina's Water

a fact sheet from Toxic Free NC

What is atrazine?

Atrazine is the most widely used herbicide in the United States, and is applied by farmers primarily to corn and sorghum crops. Atrazine is also used as an ingredient in some "weed and feed" products used by homeowners and lawn care companies. Atrazine is relatively persistent in both soil and water, and can move through the soil to contaminate ground water in areas where it is used.

In North Carolina, atrazine is applied to about 67% of cornfields, for a total estimated use of around 603,000 pounds by North Carolina farmers every year.[i] Nationally, farmers use an estimated 75 million pounds of atrazine every year.[ii] While it is widely used in the United States, atrazine has been banned by the European Union and in several African countries.

Atrazine in our waterways

In a ten-year study of the nation's streams and ground water, atrazine was the pesticide most frequently detected in water samples by the USGS.[iii] In agricultural areas, atrazine was found in nearly 90% of streams and 40% of ground water samples. In urban areas, atrazine was found in nearly 75% of streams and over 25% of ground water samples.[iv] The USGS detected atrazine in low and medium levels across North Carolina's streams and ground water, with increasing concentrations in the eastern part of the state.

Because atrazine readily dissolves in water, it

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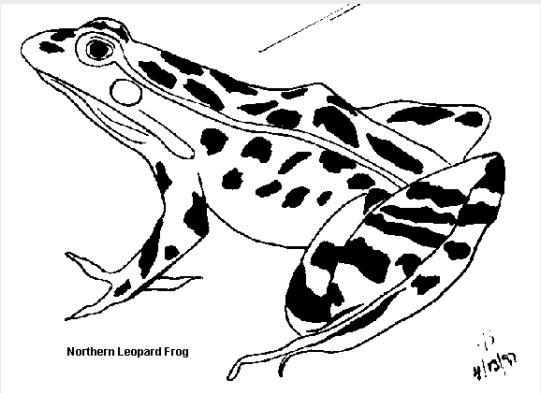
Effects on wildlife

Research published in the *Proceedings of the National Academy of Sciences, Environmental Health Perspectives* and *Nature* by Dr. Tyrone Hayes has linked very low concentrations of the herbicide atrazine to hermaphrodism and other serious deformities in frogs.

Data published in 2003 show that male frogs exposed to extremely low levels of atrazine (0.1 ppb) developed major abnormalities in their reproductive tracts. 20% of the animals exposed underwent complete sex-reversal, becoming hermaphrodites, while another 36% showed underdeveloped testes.[1]

Dr. Hayes research makes a compelling case that pesticides are a major contributor to the decline in amphibian populations across the country, and provides vital background for new science connecting exposure to hormone-mimicking pesticides like atrazine with serious human health problems like prostate cancer, breast cancer and declining sperm count.

[1] Hayes et al. 2003. "Atrazine-Induced Hermaphrodit-ism at 0.1 PPB in American Leopard Frogs: Laboratory and Field Evidence." Env Health Persp 111.



can evaporate and be moved by rainfall to areas with no agricultural use, such as the Obed National Wild and Scenic River in the Upper Tennessee River basin.[v] Atrazine has been detected in groundwater as far as 600 miles from the site of application.

Atrazine in drinking water

Besides contaminating ground water (where well users draw their water), atrazine can also contaminate the streams, rivers and lakes that supply public drinking water systems. Atrazine has been measured at drinking water intake sites as well as in treated drinking water at North Carolina treatment plants in Burlington, High Point, Greensboro and Raleigh.[vi] Because typical drinking water treatment does not remove chemicals like atrazine from drinking water, concentrations of atrazine are similar before and after water treatment.[vii]

Health effects

While atrazine is not acutely toxic when ingested, exposure to atrazine has been linked to many kinds of health effects in the laboratory.

Animals exposed to atrazine in the laboratory have experienced respiratory distress, paralysis of the limbs, structural changes in the brain, heart, liver, lungs, kidneys, ovaries and endocrine organs, as well as growth retardation. Atrazine has also been linked to cancers in the mammary glands, as well as prostate cancer and lymphoma.[viii]

Atrazine can also interfere with the sex hormones of animals exposed in the laboratory and in the wild. Recent research has shown that frogs exposed to very low levels of atrazine (0.1 ppb) developed both male and female sex organs (see box, above). The "safe" drinking water standard for atrazine set by the US Environmental Protection Agency is 3 ppb.

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[i] NC Agricultural Statistics Service. "Corn: Agricultural Chemical Applications North Carolina 2005." Available at: http://www.ncagr.com/stats/pest_use/acacnyr.htm (last visited 3/2/2007).

[ii] Gilliom et al. 2006. "Pesticides in the nation's streams and ground water, 1992 – 2001." U.S. Geological Survey, Ciruclar #1291, p. 45.

[iii] Gilliom 2006.

[iv] Gilliom 2006, p. 11.

[v] Gilliom 2006, p. 27

[vi] Jones, S.J. 2003 "Pesticide residues in surface waters of North Carolina rural and urban watersheds: Studies to determine and reduce residues in drinking water." Dissertation in Toxicology, North Carolina State University.

[vii] Jones 2003, pp. 144-147.

[viii] "Atrazine chemicalWATCH Factsheet." 2003. Beyond Pesticides.

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