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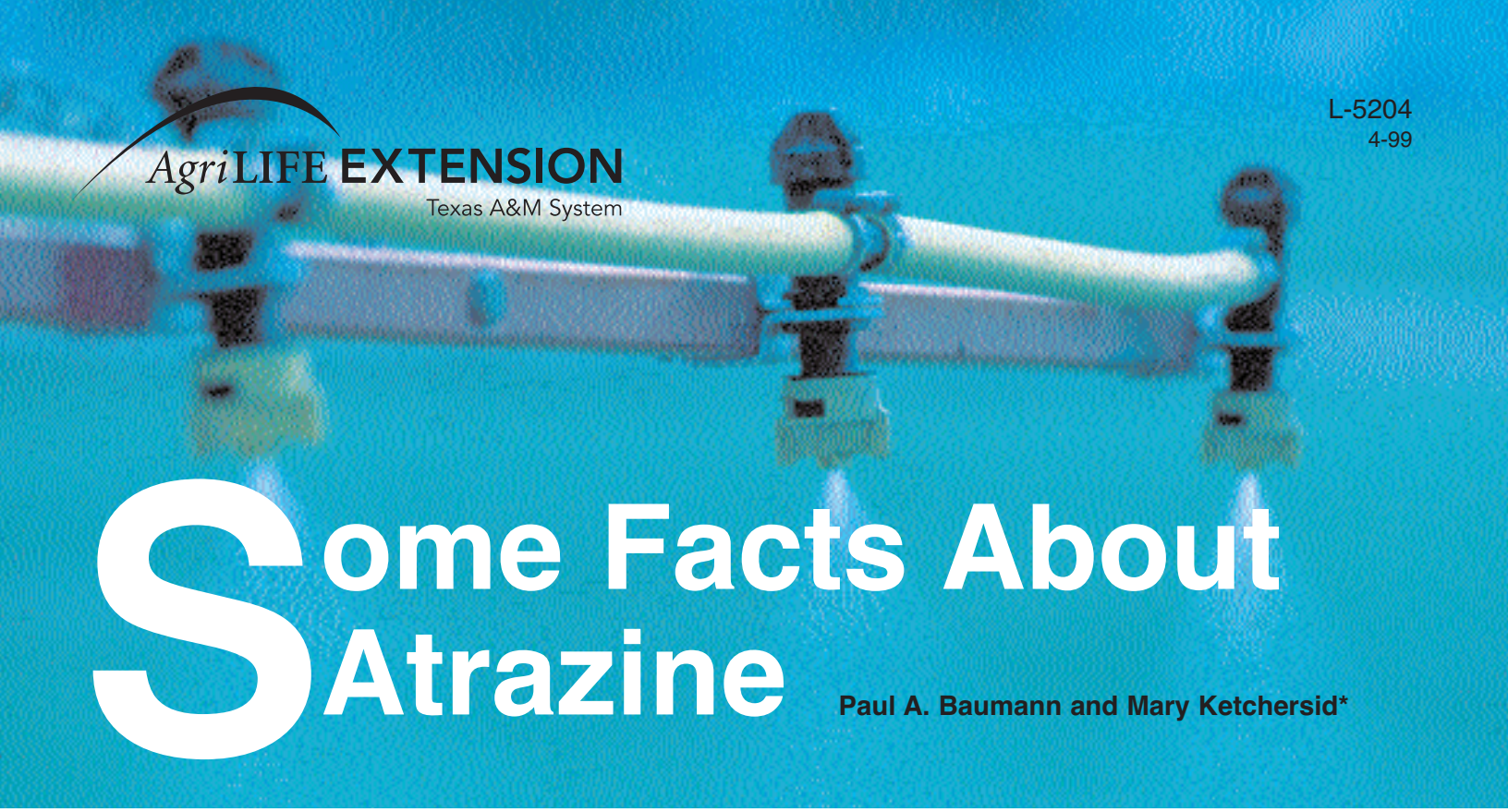

Some Facts About Atrazine

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What is Atrazine?

Atrazine is the most widely used herbicide in Texas corn and grain sorghum production. It also is often found as an active ingredient in many "weed-and-feed" products available for home lawn and commercial turfgrass weed control.

With its widespread use, atrazine has been discovered in minute quantities in Texas ground and surface waters. Because of this, it is important to understand atrazine behavior in the environment and the potential for adverse effects on human and animal health and on other non-target organisms.

Atrazine kills plants by disrupting photosynthesis. Photosynthesis—unique to green, living plants—happens when light energy is converted to chemical energy needed for food production. Simply put, when food production stops, plants eventually starve to death. Atrazine selectively kills non-desirable plants (weeds) that compete for water and nutrients with desirable plants (crops, turfgrass). Therefore, it is a useful tool for both agricultural and urban sites.

How Does Atrazine Act in Water?

Atrazine is generally applied to soil or turfgrass surfaces in a uniform, broadcast manner to ensure adequate distribution over the area in which weed control is desired. Rainfall or irrigation shortly after application transports atrazine into the upper soil profile where plant seedlings germinate. These seed-lings take up the herbicide through the roots and, depending on their tolerance, they may or may not survive. If rainfall or irrigation water accumulates at the soil surface faster than it can percolate into the upper soil profile, this standing water might run off the site of application, carrying some of the atrazine.

Since atrazine is moderately water soluble, it will be present in the surface runoff water as well as in the soil water percolating downward. Atrazine is needed in the upper soil profile for weed control. Its movement downward through the soil, or leaching, is limited by its ability to attach itself to soil particles. Soils high in clay and organic matter content are less likely to let atrazine move downward than sandy soils. Atrazine will generally stay in the upper 1 to 6 inches of the soil profile on most agricultural soils.

The presence of atrazine in surface water runoff is of greatest concern. Atrazine can be washed off the site of application to other sites where non-tolerant vegetation grows. It also can be carried into streams and other tributaries that flow into surface water that may be used as a source for drinking water. Atrazine has been detected at very low levels in surface waters at several locations throughout Texas. However, such occurrences are few considering its widespread use. Normal water purification systems used by municipalities do not remove atrazine from the water.

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Should the Public be Alarmed?

If atrazine is a "plant poison" and is occasionally found in ground water and drinking water, should the public be alarmed?

To answer this question, consider the following points.

- Atrazine has a very low mammalian toxicity.
- It would be very difficult or impossible to ingest a toxic dose from natural sources.

Toxicity is usually defined in two ways—acute or chronic. Acute toxicity refers to the amount that would be required to cause a specific effect when taken at one time, while chronic toxicity refers to the amount that can cause an effect if taken continuously over a long period of time.

The table below compares the acute toxicity (from most to least) of some common materials to atrazine (note that a higher LD_{50} is less toxic).

It is important to remember that the DOSE makes the POISON. We rarely stop using something we want or need simply because it could be poisonous at some level. Even the more toxic substances in the list are safe because they would not be ingested at a toxic level in normal use. For example, there is a lethal dose of caffeine in approximately 100 cups of strong coffee, but coffee drinkers survive because they do not drink 100 cups of coffee at one time. A bottle of 100 adult aspirin tablets could also contain a lethal dose. A 150-pound person would need to eat 1 cup of pure atrazine at one time to receive a potentially toxic dose. Our bodies have built-in defense mechanisms which detoxify foreign chemicals that we swallow in non-toxic amounts. As with table salt and aspirin, we could not accidentally swallow enough atrazine to be lethal.

Chronic effects are more difficult to produce than acute effects. In order to produce negative chronic effects, test animals must be fed artificially excessive amounts of atrazine over a 2-year period, at levels far above any amount ever detected in a food product.

What is Considered a Safe Level?

The Environmental Protection Agency (EPA) has established a maximum contaminant level (MCL) for atrazine. Drinking water that meets this standard is considered safe with respect to atrazine. The calculated MCL for atrazine in drinking water is three parts per billion. This is an amount similar to three cents of $10 million. The EPA believes that water containing atrazine at or below this level is acceptable for drinking every day over the course of one's lifetime. In fact, in order to obtain an acute dose of atrazine from water contaminated at this maximum level, a person would have to drink more than 9 million gallons of water or all of the water in 14 Olympic-size swimming pools. In this case, the water would be a greater problem than the atrazine, because drinking more than 15 percent of one's body weight of pure water also can be lethal.

Even though there may be a small amount of atrazine in our environment, we are not likely to take in a high enough dose for it to be either acutely or chronically toxic.

Judicious and careful use of atrazine by farmers, home users and commercial herbicide applicators can go a long way towards the prevention of atrazine contamination of surface and ground water. Application devices should be properly calibrated to ensure that no more is applied to a given area than is needed. Proper herbicide container cleanup and disposal also are essential protection practices. More importantly, atrazine should be considered as only one tool in an integrated approach to weed management, which also should include cultural and mechanical methods along with spot treatment or banded herbicide applications where feasible.

Chemical Tested	Acute Oral LD_{50} MG/KG*	Relative Toxicity
caffeine	192	most
aspirin	1,750	
atrazine, pure	3,090	
table salt	3,750	least

*The acute oral toxicity (LD_{50}) of a chemical is the amount that kill 50 percent of the animals in a test, generally laboratory rats. It is measured as mg/kg or ppm of body weight.

This publication was produced by the Texas AgriLife Extension Service in cooperation with the Texas Department of Agriculture, USDA-Natural Resources Conservation Service, Texas State Soil and Water Conservation Board, and Texas Natural Resource and Conservation Commission.

Produced by AgriLife Communications, The Texas A&M System

Revision CHEM, E&NR 5