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JOHN'S CORNER: FLOURIDE

By John Ferguson

Over the years I have found that when I visit properties or talk with customers, over watering is the problem at least 85% of the time. I have also known for years that chlorine and chloramines that are added to our water kill microbes like bacteria. Hence the more one waters their lawn or landscape with water from public systems the more disease problems they have, as these chemicals kill the good microbes that protect plants from soil pathogens.

I was reading a new study published in the journal Toxicology that found that fluoride has demonstrated cardiotoxic effects which include the *calcification and hardening of the arteries* on humans. Other animal studies have shown the nephrotoxicity of this common additive and even death. I have known for years that Fluoride is extremely harmful to human health (birth defects, lower IQ, impaired immune system, osteoporosis, kidney, bone and muscle problems and cancer). Researchers found that levels as low as 1.5 ppm (parts per million) have both lethal and adverse effects on salmon. So I started wondering; does fluoride affect soil microbes and plants? I then decided to research it and find out more. As a result, this is the subject of today's column.

The product we call Fluoride contains the element Fluorine (F) which is extremely reactive chemically and is very toxic to mammals and many other life forms. The military considers fluorine one of its best chemical warfare agents. We now know that the studies showing it to prevent cavities were falsified by the companies wanting to get rid of an industrial hazardous waste resulting from the manufacture of aluminum and phosphate fertilizer saving them billions of dollars in disposal costs.

Landscaping Problems Associated with Fluorine (Fluoride)

Fluoride generally remains in solution and plants are exposed to this chemical by water, air and soil. Fluoride is a poison that accumulates in plant foliage and often leads to toxicity symptoms on sensitive plants. This happens over time, thus we may not realize why are plants are getting sick and declining or just die suddenly. Fluoride strongly inhibits photosynthesis and other processes in the plant. It is absorbed by the roots (or stomata) and moves through the plant accumulating in the leaf margins.

Plant pathologists at OSU have found that typical fluorine injury symptoms on broadleaf plants include marginal and tip necrosis (pre-mature cell death) that spread inward. On conifer needles it spreads towards the base of the needle. The symptoms produced often look similar to drought or salt stress.

A wide variety of plants are fluoride sensitive. A few examples by common name are: apricots, box elder, blueberry, sweet corn, Douglas-fir, gladiolus, grapes, Oregon grape, western larch, peach, pine, plum, blue spruce, tulip, corn plant, yucca, spider plant, Tahitian bridal veil, lilium spp. (list from Plant Disease Handbook).

Another study found by botanical name that *Calarhea spp., Chamaedorea elegans, Chiorophytum comosum, Cordyline terminalis, Ctenathe oppenheimiana, Dracaena spp., Gibasis pellucida, Lilium spp., Maranta leuconeura, Spathiphylium spp.,* and *Yucca spp*. are very fluoride sensitive to as little as 1 ppm in water.

As you can see a wide variety of plants are subject to fluoride damage. Other plants although not sensitive are hyper accumulators of fluoride like spinach.

Other Sources of fluoride:

We find that some types of perlite are high in fluoride and must be leached before use. Other products like super phosphate fertilizer is made from the mineral apatite which is high in fluoride (another reason not to use artificial fertilizers). The waste product from the phosphate fertilizer production is hexafluorosilicic acid along with other toxics like arsenic, lead and small amounts of radioactive elements (and this is what is added to our drinking water).

Other sources include bone meal (which can contain 1,000 ppm of fluoride) or sodium fluoride (NaF) which is considered an inert substance by the EPA and allowed in the Organic Standards and used in many common products.

Other sources of fluoride are found in wine and grapes due to the fact that many pesticides (over 150) contain fluoride due to its extreme toxicity. This is why eating conventional produce is a major source of fluoride due to pesticide residues and another reason to "go organic". Many other studies have linked fluoride to Alzheimer's disease and other forms of dementia.

LANDSCAPING SOLUTIONS:

1) The first step is to avoid using public water supplies if it contains fluoride.

2) If you suspect that you have a fluoride problem one can add extra calcium to the soil. The calcium reacts chemically and binds with the fluorine atom to form calcium fluoride ($CaFl_2$) which is insoluble and prevents a plant from absorbing the fluoride. Greensand and Ag-lime are good sources of calcium.

3) Use rainwater - another good reason to install a rain barrel or other rain capture system.

4) Filter the fluoride out of the water. There are several ways to filter water with reverse osmosis being the most effective but is wasteful of water and energy. There are under sink filters based on Activated Alumina. Distillation is an effective method of removing fluoride but energy intensive. Other filters use animal bones that have been charred at high temperatures. The fluoride binds to the charred material as the water moves through the filter.

Note: The only inline garden hose filter that claims they remove fluoride was the ecoONE in references below.

SUMMARY:

I now know why I will occasionally loose a plant in my greenhouse. The fluoride builds up in the potting soils and leads to the plant decline. Even now I have a couple of small Mexican Bay trees that have started showing symptoms and I could not figure out what was wrong. Now I have a working theory and will take water from my pond and try and flush the soil and see if I can save them.

REFERENCES:

The Fluoride Deception, Christopher Bryson, Seven Stories Press, 2004, ISBN: 978-1-58322-700-8. This book exposes the cover-up on the dangers of fluoride by the EPA and FDA to protect the profits of major corporations by allowing this toxic waste in our water and food supply.

The Case Against Fluoride - How Hazardous Waste Ended Up in Our Drinking Water and The Bad Science and Powerful Politics That Keep It There, Paul Connett, PhD, James Beck, MD, PhD, H.S. Micklem, DPhil, Chelsea Green Publishing, 2010, ISBN 978-1-60358-287-2 This book covers all the latest research on fluorine and its dangers to human health and why almost every country in the world no longer allows it.

Fluoride the Aging Factor: How to Recognize and Avoid the Devastating Effects of Fluoride, by John Yiamouyiannis, PhD, 1986, ISBN 13: 978-0913571019

Dr. Yiamouyiannis was a biochemist whom first exposed the history of how certain companies duped the medical community into putting a hazardous waste into our water supply.

http://www.fluoridealert.org - website dedicated to removing fluoride from public water systems

http://articles.mercola.com - good summary of health problems associated with drinking fluoridated water

http://www.exposingthetruth.com/how-to-remove-fluroide - an over view of the different filtering methods

http://www.boogiebrew.net/water-filter/ - inline garden hose filter to remove chlorine and chloramines (not fluoride) a step in the right direction, good for 35,000 gallons.

http://www.cleanwaterfun.com/Garden_Hose_Filter.html - inline garden hose filter to remove chlorine and chloramines

http://www.asktheecogeeks.com/environmental-products/ecoone-hose-filter/ - EcoONE hose filter- they claim they remove fluoride along with heavy metals and many pesticides. Good for 40,000 gallons.