The Birth of Chemical Practices.

With the technology developed during two world wars which lead to chemical warfare and high nitrate explosives being mass produced, farmers could significantly increase crop yields and lower their labor costs. Huge advances in mechanical technology increased productivity and made it possible for vast tracks of land to produce more crops than ever before in history. Large agricultural corporations materialized. Small family farms could not compete and were eventually forced to sell their farmland or diversify.

The lawn care industry benefited from these advances as well. Large corporations manufacturing chemical pesticides, synthetic fertilizers, grass seed and lawn & landscape power equipment grew rapidly as did professional lawn care and landscaping service providers. Many companies began providing pest control services to control termites, borers, ants, roaches, and other pests, inside our homes.

Chemicals that were highly toxic and had a half-life of 50 years or more became big business. Chlordane, Toxaphene and DDT covered our landscapes and found their way inside our houses. These harsh chemicals were massed produced and over applied for decades.

I am old enough to remember the vector control fogging trucks riding through my neighborhood. Many of us (kids) would ride our bikes behind the fogging trucks because we thought it was great fun. Little did we know, the fog was toxic insecticides that had no specific target. The chemicals would drift or be carried by wind, working their way into our houses and businesses. They landed on our food and in our water supply. They entered our bodies and altered our DNA. The worst part of it was, the chemicals hung around for 50 years or more and the scientific elite can't seem to agree what the long-term effects are to our health and to our environment.

In 1962, Rachel Carson authored a book titled "Silent Spring" exposing the adverse environmental effects caused by these toxic chemicals. There was public outrage which helped spawn a movement that would lead to the banning of the most toxic chemicals and usher in, less toxic, safer chemical control products. But were these new products really safer? And, did we

really get away from those toxic chemicals from the past?

DDT production continued for decades more in the United States, Canada and Mexico. The use of DDT was banned in the U.S. But DDT production in the U.S. continued for decades. The U.S. sold the DDT to other countries in central and south America, and then purchased fruits and vegetables from Mexico and South America where toxic chemicals remained in use until the year 2000. Today, chemicals banned long ago in North America are still mass produced and used in China, India and North Korea. Traces of the most toxic chemicals can still be found in our landscapes, farm fields, our drinking water and inside of our houses. Other elements such as arsenic which occurs in organic and inorganic forms can be found in many plant-based foods, especially rice. Brown rice contains the highest levels since the husk is not removed in the processing. Rice is very absorbent and arsenic levels can run 20% or higher in rice that other grains.

What can you do as a consumer to limit your exposure?

You can buy organically grown fruits and vegetables but that's not always a safe bet. Many organic farmers cheat. They use synthetic fertilizers and chemicals to save on costs and crop losses but they still fetch a premium price in the market while claiming the crops are organically grown. Many organic crop inspectors are friendly with the organic farmers that cheat, and/or the inspectors accept illegal bribes from the cheating organic farmers. I've seen this first hand. It's nothing new and it likely will not go away anytime soon.

I once sold a tractor trailer load of composted poultry manure fertilizer to an organic tobacco farmer in Virginia. That is an oxymoron if ever there was one. One day the tobacco farmer called me and told me I needed to come and see his organic tobacco crop. I drove down the next day and learned that most of the farmers in the region were growing organic tobacco in that county. My customer gave me a tour of his fields. His tobacco crop was off-the-charts amazing. The plants were over seven feet tall, with lush, dense growth all the way down to the soil. The leaf tissue was thick and hardy despite a three-week drought in that county.

After we toured his fields, he showed me several other fields that belonged to his neighbors. The other farmers were using a popular organic fertilizer

derived from meals. Bone meal, feather meal, blood meal etc. These tobacco plants were anywhere from knee high to waist high and obviously struggling in the drought conditions. It made sense to me because I knew that meals-based fertilizers are very slow to release.

The farmer then showed me several other fields where the tobacco was tall and lush but when we looked closely at the leaf tissue, it was obvious the tissue was thin and elongated. It was fertilized with synthetic, conventional fertilizer. My farmer customer told me about the good old boy network in that county where the inspectors were buddies with the farmers and allowed these farmers to cheat.

This cheating carries over into other food production as well. Chicken, pork, beef and seafood, sold as healthier more expensive alternatives might not be what you bargained for. The only way to truly escape the chemical threat is to grow your own fruits and vegetables, raise your own livestock, catch your own seafood and take up hunting wild game.

Let's see. What can we possibly pile onto the monumentally dismal reality of chemical exposure? Household cleaners, cosmetics, personal hygiene products, building materials, new clothing and fabric, carbon dioxide emissions, lead based paint and pharmaceuticals. I'm sure I left some out but you get my point.

Modern crops have been genetically modified through gene splicing and other reproductive marvels These new generations of crops are immune to chemical weed controls like Glyphosate (Roundup) which allows corn, soybeans, and other crops to receive blanket coverage applications of broad-spectrum, post emergent weed control chemicals without any damage. The application systems are fully automated through GPS satellite technology that determines where and how much chemical gets applied. The food we eat is completely treated with chemicals, on purpose! Heck, without Roundup, the world would likely starve to death.

By the 1960's, conventional fertilizers that released the nitrogen quickly had all but replaced the old-world practices of adding organic materials. Agriculture, professional lawn care, golf courses and homeowners had become addicted to quick, cheap, and green. Universities with agricultural

and turf management programs were touting the benefits of conventional fertilizers and chemicals. The scientists were educating the students on how to grow and maintain turf grass the same way you grow and manage corn. The problem is, corn is a 90-day crop. Turf grass is a perennial crop with the growing season lasting six-to-twelve-months, depending on the turf type and the climate zone.

Why did all those universities tout chemicals and synthetic fertilizers for decades? FUNDING. Big Ag, big chemical companies and big fertilizer manufacturers were, and are, still funding all those reputable universities by having them conduct research studies. It is an expensive marketing campaign that gets factored into the cost of goods. The end user is funding the research and marketing campaigns of gigantic Green Industry companies.

The privately funded research has a single purpose. To provide support of claims made to promote products. It makes a product seem credible and builds the reputation of the manufacturers that provide the funding. For all the research available to support a claim, you can usually find research to refute the claim. Mostly, this occurs when a competing company or manufacturer has suffered losses in sales due to the initial research that supports a claim. But who are the winners, and who are the losers in these ongoing battles? It is always the same no matter how the battle plays out. The winners are the universities, and the losers are the consumer.

Quickly available nitrogen recommendations coming from academia were wasteful. Especially for turf and landscapes. The plant roots will only uptake about a quarter of a pound of nitrogen per 1,000 square feet over a three-to-four-week period. In most cases, the recommendations from the universities and the fertilizer manufactures called for four times that amount to be applied at one time. The problem here is the quickly available nitrogen releases 100% of the nutrient over a three-to-four-week period so 75% of the nitrogen volatilized, leached into the ground water, or ran off and ultimately ended up in the water. This practice still occurs to this day but it's not as widely practiced as it once was.

Urea nitrogen is by far, the most commonly applied form of nitrogen in the world. It makes up more volume than all the other nitrogen sources

combined. Urea comes from the atmosphere. It's produced from natural gas so it begins its life as a gas, is processed into a liquid and finally converted into a solid prill or granule. It is very hydroscopic so it can wick-up moisture out of the air and breakdown into a liquid. The urea will revert to its original state as a gas. This volatility contributes to a significant amount of the nutrient loss

By the 1960's, slow-release nitrogen technologies ushered in a new era. Urea nitrogen was coated in sulfur to slow the release. This was an improvement but the problem was, the sulfur coated urea released when fractured during production, blending, packaging and handling. It's called catastrophic release. Once the coating gets wet or fractures through handling, the coating is no good. About the same time, new technology was developed for urea with longer carbon molecule chains that slowed the release of the urea nitrogen. It is called Methylene Urea. This was much more efficient but very expensive. Both slow-release technologies are still used today.

Other coated urea technologies emerged which used polymer coatings and a combination of polyurethane and sulfur. These were a significant improvement but still fell short of providing optimal efficiency between the release of the nitrogen and the ability of the plant roots to uptake the released nitrogen. These newer coated release technologies are still susceptible to catastrophic release and excessive rainfall or irrigation will speed up the release window. From an environmental impact standpoint, the new technology created efficiency so most of the nutrient gets taken up and used by the plant. Conversely, the polymer coating is a form of plastic which can take hundreds of years to completely breakdown. This adds to the massive amount of microplastics that persist in our environment and work their way into our food, water, and our bodies, building up to higher levels with every exposure before the damage can be discovered.

Today, we have newer cutting edge coated technologies that release with temperature. You can drop the material in a bucket of water and it will not accelerate the release rate. These are higher grade plastics that have value, but what the manufacturers are formulating mimics the nutrient release of organic fertilizer sources.

One of the most common objections to organic fertilizers is, they are slow to

release. This common objection gives off a negative connotation like slow release is a bad thing. For decades, slow-release technologies have evolved into the most valued fertilizer materials in the world. Why is it that when slow release is related to organics, it's a bad thing but when it's synthetically derived, it's a very good thing? It’s all part of a larger agenda to drive sales of conventional synthetic fertilizers and create dependency. Reverting back to the old-world practices of applying manure waste to crop fields, addresses multiple environmental problems.