



Better Safe than Sorry!

An Appeal for taking a Precautionary Approach to the Use of Pesticides in Bermuda

"The European Chemicals agency estimates there are more than 144,000 man-made chemicals in existence. The US Department of Health estimates 2000 new chemicals are being released every year. The UN Environment Program warns most of these have never been screened for human health safety,"

Given this startling fact, should we continue using the pesticides, which we actually KNOW to be harmful to human and environmental health? The BUZZ group thinks not, and explains why.

So, who are we?

The BUZZ is a group of concerned citizens who came together in 2013 under the auspices of the Bermuda Environmental Sustainability Taskforce (BEST) to look into the causes of the local and global die-off of honey-bees. It did not take long to learn that one of the threats to the health of bees is the use of pesticides. These are chemical products, produced, sold and used specifically to kill. Pesticides include all preparations sold as herbicides, fungicides, insecticides and any other products whose name ends in '-cide'. Adding the suffix '-cide' denotes a person or substance that kills.

Having spent a few years looking closely at the use of pesticides generally, the group's mission has become "to protect the environment and human health by advocating for effective regulations on pesticide sales and use in Bermuda". As a result, the following general information about pesticides may assist consumers to make informed choices about the use of such products that have an adverse effect on the health of the community and the environment.

To quote renowned environmental scientist, Jane Goodall, "What **you do makes** a difference, and **you** have to decide what kind of difference **you** want to **make**."

Using pesticides: If a little is good, is more better?

Health and well-being are less a matter of luck than of truly understanding what our options are, before taking action. They require individual and collective effort, with special responsibility on

the part of governments, who are empowered to make the best decisions on behalf of their trusting constituents – that is, all of us. It is unlikely that the average citizen’s general education included lessons on safe weed and pest management, or the dangers of the many chemical ‘solutions’ that we are encouraged to use. Reading the small print on bottles or containers of chemicals we may purchase to get rid of one thing or another in our homes or yards is often overlooked.

During our research a text-book was found that provided some general information worthy of consideration: “Common-Sense Pest Control: Least-Toxic Solutions for Your Home, Garden, Pets and Community” - by [William Olkowski](#) (Author), [Sheila Daar](#) (Author), [Helga Olkowski](#) (Contributor), [Shelia Daar](#) (Contributor). We recognise that there are a number of technical references in the following points, however, in order to fully appreciate the complexity and hazardous effects of pesticides on human health and the environment, it is important to be aware of the whats, whys and hows.

1. **What is a pesticide?** The classification of chemicals as pesticides is complicated but the word “pesticide” is an umbrella term for all the sub-categories of materials used to suppress pests.
2. The information given with any chemical product must be enough to enable the consumer to select the safest, most effective material and apply it in a manner that protects both the consumer and the general environment.
3. Many chemical products were left over from WWII and, given their ability to kill things, were repurposed for the agricultural chemical companies. Chemicals like DDT decimated the environment. The ensuing destruction failed to impress many responsible people of the real threat posed to human and environmental health. Amazingly, to this day, over 40 years later, DDT remains detectable in the human population.
4. **What is a broad-spectrum approach?** This refers to how the targeting and control of a wide range of insects, is also harmful to beneficial insects and microbes and can contaminate groundwater and other resources. Alternative methods, which minimize the risk to human health, should **always** be considered.
5. In the U.S., if a product is sold as a pesticide, it must be registered at the federal level and must carry labels describing the proper dosage and frequency of application for the control of specific pests. Also required is a list of active ingredients, the relative toxicity to mammals and other information including cautions regarding hazards to humans and the environment. The creditability of these regulations is questionable.
6. Most people feel that if something is ‘for sale’ to the general public, then it is safe. We know now, that in far too many instances, this is not true.

7. **What's in a name?** The naming of compounds in pesticides can be confusing as there may be numerous names for the same product: a **generic** name, a **chemical** name, a **trade or brand** name.
8. **How do pesticides work?** The least-toxic pesticides operate physically or mechanically, causing the pest to dehydrate and die. Some disrupt enzymes, hormones, or other biophysical processes. The total impact on the organism and the environment of these other types of pesticide is difficult to predict, and unintended side effects are more often encountered.
9. **The formulation** of a pesticide refers to the mixture of its active ingredient with other ingredients that affect the active ingredient (i) solubility, (ii) ability to stick to vegetation or insect bodies or (iii) other functions.
10. **"Other ingredients"**. Substances in the product, other than the active ingredient, are referred to as 'adjuvants'. An example of an adjuvant is a surfactant, which allows the product to stick to the plant's leaf to maximize the pesticide's effectiveness. These adjuvants may be referred to as "inert substances", a misnomer since they generally are not 'inert', at least not as most of us understand the word 'inert'. In some cases these other, 'inert' substances are more toxic than the active ingredient itself. **Of real concern is that only the active ingredient is tested by the registration agencies, not the complete formulation of a pesticide, which is what people and other non-target organisms are exposed to! (it should be noted that many chemicals, active or otherwise, have NOT been tested for their effects on human health)**
11. **How are pesticides classified?**
 - (i) by their target pest group (eg. herbicides for plants, fungicides for fungi, miticide for mites)
 - (ii) by formulation (baits, dusts, fumigants, granules, sprays)
 - (iii) by chemical category (inorganic, organic)
 - (iv) by function (eg. attractant, repellent, insect growth regulator)
12. Insecticides can also be classified according to the stage in which they are effective: an ovicide attacks eggs; a larvicide, the young; and an adulticide, mature individuals.
13. Herbicides can also be classified according to when they are applied in the life cycle of plants. Pre-emergent herbicides are applied *before* the weed germinates; post-emergent *after* the weed growth is underway. Additionally, a selective herbicide is intended to kill certain weeds but leave desirable plants, whereas a non-selective herbicide is toxic to most plant material it encounters.
14. Contact herbicides injure or kill plants on contact with their foliage. They kill only that part of the plant with which they come into contact.

15. Systemic herbicides move through the entire plant system carried by water and food streams, to the plant's active growth centre, which they damage or destroy. They can be applied to the soil around the plant or to the plant's foliage. More recent research shows that this type of herbicide also has serious consequences on visiting insects (eg. bees and butterflies). Glyphosate is the most common, active ingredient in many systemic herbicides. The brand name of a well-known pesticide containing glyphosate, which is sold in Bermuda, is RoundUp.
16. Soil residual herbicides are those that remain active in the soil for relatively long periods, depending on the dosage. To be effective, they must be sprayed directly on emerging plant shoots or washed into the soil where they are taken up by the roots and carried to the leaves. They are relatively ineffective when sprayed on mature foliage.

How could pesticides be toxic to humans?



17. There are two general kinds of toxicity: acute and chronic. A given dose of a poison is said to have acute toxicity if it affects human health adversely after a relatively short-term of exposure. It has chronic toxicity if it has an adverse impact after long-term exposure, which can range from days to years.
18. The most common method of measuring the acute toxicity of a pesticide is by an extremely cruel process of giving test-animals (dogs, chickens, rabbits, monkeys, pheasants, ducks, rats) known doses of the poison, and observing the results. Critically important to realize, however, is that animal testing is imprecise at best. Humans may not react to the poison exactly as other animals do.
19. Acute toxicity can also be caused by pesticide vapor or dust getting into the air or waterways.
20. **How do we interpret labels?**



By law, a 'signal word or symbol' must be included on every pesticide label to give the user some indication of the toxicity of the material. Caution indicates materials that are least-

toxic, warning or danger indicates they are most toxic and are generally restricted to use by professional pest control operators. This important information is more often than not, in 'fine' print, which makes it almost impossible to read! Let's ask ourselves: Do we actually read and research each material listed on the label?

21. **How could people be exposed?** Oral, dermal (on the skin) inter-dermal (in the skin), inter-ocular (in the eye) inter-nasal (in the nose) and respiratory (in the lungs).
22. The respiratory route of entry is usually the most toxic of all because pesticides are absorbed most rapidly through the lungs and distributed throughout the body in the bloodstream, causing all organs and tissues to be exposed rapidly after inhalation.
23. The eye is also highly susceptible to the absorption of pesticides, which is why it is important to wear goggles whenever pesticides are applied. Other areas that are highly susceptible are: male genitals, the armpit, ear canal and face.
24. Toxicity ratings do not indicate chronic or long-term effects. Chronic effects may be carcinogenic (causing cancer), mutagenic (causing genetic changes) or teratogenic (causing birth defects).
25. There is substantial variation in the effects and impact of a toxic substance from individual to individual and from one developmental stage to another. For example, children, the elderly, pregnant women and the sick are more vulnerable..
26. Data on chronic toxicity (i.e. effects of exposure over a long period) is woefully inadequate or completely missing for most of the hundreds of registered active ingredients in pesticide products. Alarmingly, inert ingredients are not required to be tested and 90% - 99% of the formulation is made up of inert ingredients! The fact that inert ingredients are not listed or tested is of grave concern.
27. **What is synergism?** This occurs when one compound enhances the effect of another many times beyond what would be experienced if either were encountered alone. This is why, for example, alcohol should not be combined with certain drugs. It is very difficult to determine safe levels when taking into account that we are exposed daily to multiple sources of toxic materials.
28. There are a growing number of "chemically sensitive" individuals who suffer damage to their immune systems from chronic exposure to synthetic compounds such as pesticides.
29. Manufacturers are required to provide a material safety data sheet (MSDS) for each pesticide they produce, to describe the chemical characteristics of the active and other hazardous ingredients.
30. **What are the dangers to the environment? (bio magnification):**

The application of most pesticides often results in only a small amount of the poison actually reaching the target pest. Most of the material lands in adjacent areas, meaning that it falls on non-target organisms, plants, animals (including ourselves) and the soil.

31. All kinds of undesired side effects can result. For example, fungicides used against a plant disease may fall on and become incorporated into the soil, inhibiting the growth of the beneficial fungi called *mycorrhizae*, which are important in helping the plant to obtain nutrients. Research shows that fruit and vegetables eaten today are less nutritious than a few decades ago.
32. Some pesticides accumulate in food chains and become concentrated in the bodies of the organisms that eat those plants or animals. For example, organisms such as earthworms that are low on the food chain may eat many fallen leaves. Even though each leaf holds only a small amount of pesticide residue, the pesticide becomes concentrated in the earthworm's body because of the number of leaves it consumes. This concentrated dose is then passed on to the earthworm's predators, such as birds and because a single bird eats many earthworms, the pesticide reaches even higher concentrations in the bird's body. Finally, at the top of that particular food chain, bird predators such as cats may ingest such high concentrations of poison that they become sick or suffer in other ways.
33. **What is meant by Residue, Resurgence, Resistance and Secondary Pest Outbreaks?**
Residue: Pesticides sprayed inside a house could fall on dishes and other surfaces or mix with the air we breathe. Outside, they often get into the groundwater or other waterways. From there they can contaminate wells or have undesired effects on aquatic life. In 1988 the EPA found the groundwater in 38 US states to be contaminated by 74 pesticides. It is primarily the residue problem that inspired Rachel Carson's book *Silent Spring* about the devastating effects of the use of DDT. Since then the use of other pesticides has grown exponentially.
 - a. Resurgence, Resistance and Secondary Pest Outbreak are of greater direct concern to the pest manager, landscapers and roadside spraying crews.
 - b. Resurgence occurs when the predators that would naturally control the pests are temporarily removed or drastically reduced in number by the use of the pesticide, resulting in a resurgence of the pest with fewer predators to keep it under control naturally.
 - c. When the gardener sees that the pest has returned, the temptation to re-spray, or worse, to spray more than the recommended dose, may only exacerbate the problem. Populations of predators often take longer to build back up than the pest. Additionally, the pesticide used may be toxic to the beneficial predator. For example, the treatment for aphids (as with the product Sevin) is also toxic to the aphid's predator, the ladybird... and incidentally to honey bees!



- d. Resistance can potentially cause more problems than residue or resurgence. Each time a pesticide is applied, some of the pests that survive to produce the next generation, develop a means of avoiding or detoxifying the poison. This is very different from immunity where the body develops antibodies to a disease organism. The resistance we are referring to is one of forced genetic selection. By creating a situation where only those organisms that can tolerate a pesticide survive and reproduce, it gradually becomes harder to reduce pest numbers through application of the poison. In response, many people increase the frequency of treatment and/or the strength of the dose.
- e. In agriculture, resistance to pesticides has become a matter of world-wide concern. Switching to a new compound may help, but that success may be short-lived due to the phenomenon known as *cross-resistance*. Once a pest has developed resistance to one class of chemicals, it may develop resistance to others and often in a short time. The implications of this phenomenon for the field of public health are particularly important.
- f. More than 600 pest insects, weeds and plant pathogens are now resistant to one or more pesticides. For this reason, chemical tools can only be regarded as temporary solutions.

Why take the 'Precautionary Approach'

Worth highlighting again are the unintended consequences of using these pesticides, such as the fact that they also kill beneficial insects and organisms, including those in the soil, on which we are dependent for growing the vast majority of our food.

So, there is much to consider when using chemical products which is why The BUZZ supports taking a 'precautionary approach' to the use of those products both in private homes and in public places.

"The precautionary principle enables decision-makers to adopt precautionary measures when scientific evidence about human health hazards is uncertain and stakes are high." (The European Parliament Think Tank – December 9, 2015).

It is, therefore, an approach that protects human health and the environment.

The call for care and caution is not a new one:

In 2000, prior to The BUZZ taking an interest in the risks associated with pesticide use in Bermuda, another local group, the Pesticide Focus Group, was working to raise awareness about the proper use of pesticides, and to encourage the use of non-toxic alternatives. The flyers they produced from their work are posted on the Resources page of the BEST website. For some of their Royal Gazette articles, see:

- The Canaries in the Coalmine:

<http://www.royalgazette.com/article/20010423/NEWS/304239996>

- Awareness Campaign Urges Residents to Use Healthier Alternatives to Pesticides:

<http://www.royalgazette.com/article/20040703/NEWS/307039993>

- A Case for Responsible Pesticide Use:

<http://www.royalgazette.com/article/20020108/COMMENT/301089975>

- We have been more of a cheerleader behind the scenes:

<http://www.royalgazette.com/article/20091117/ISLAND/311179968>

Ten years ago, in 2009, legislation was introduced to provide better protections for human and environmental health by regulating the importation, sale, use, transportation, handling, storage and disposal of pesticides. Unbelievably, save for the introduction of some controls on the importation of chemical products, the Pesticide Safety Act 2009, which also deals with human health, is still not in force.

Back to The BUZZ... we think you'll agree that the risks far outweigh the benefits, but don't just take our word for it:

In early 2015, the BUZZ was preparing to call for a ban on the use of neonicotinoids, a group of systemic pesticides that was being implicated as a major threat to the bee populations, until a local farmer urged us to redirect our attention to a product called glyphosate another systemic pesticide. He suggested that this chemical, glyphosate should be of greater concern to us. Interestingly, in May 2015, the Bermuda government announced a 6-month ban on the importation of a glyphosate-based pesticide, RoundUp. The ban was changed slightly in February 2016 to apply only to the importation of concentrated forms of glyphosate products. The Ready-to-Use formula continues to be imported and is available for use on private and public lands.

The chemical glyphosate is the active ingredient in the most widely-used pesticide in the world. (18.9 BILLION pounds since 1974) Globally it is used by the ordinary homeowner, commercial farmers and recreational operations like golf courses, as an herbicide to kill weeds and as a desiccant, a drying agent, which helps to evenly ripen fields of a crop for harvest. It is well-documented that this pesticide and these practices threaten both human health and the health of the soils on which we are dependent for our most important/nutritious food products.

Glyphosate is classified as a 'probable carcinogen' by the International Agency for Research on Cancer (IARC) of the United Nations' World Health Organization (WHO). Originally developed as an antibiotic, it is genotoxic (damaging to DNA) and binds to minerals, thereby shutting down metabolic pathways and damaging mitochondria.

Compelling evidence is given about glyphosate's impact on gut health glyphosate by Dr. Stephanie Seneff, Senior Research Scientist at MIT):
<https://www.youtube.com/watch?v=cn7EYfRV2g0>

Further, a 2014 article by The Cornucopia Institute highlights the toxicity of glyphosate:
<https://www.cornucopia.org/2014/03/gut-wrenching-new-studies-reveal-insidious-effects-glyphosate/>

Additional Reading:

Whitewash: The Story of a Weed Killer, Cancer, and the Corruption of Science by Carey Gillam.
"Whitewash is more than an expose about the hazards of one chemical or even the influence of one company. It's a story of power, politics and the deadly consequences of putting corporate interests ahead of public safety."

What is happening with glyphosate internationally?

Recent jury trials found that glyphosate-based herbicides caused the cancer in Mr. Dewayne Johnson and Mr. Edwin Hardeman in the U.S. and Mr. Paul Francois in France. In addition to the product itself being found to cause these cancers, Monsanto was also judged to have acted with malice, deliberately withholding evidence pointing to the harmful effects of glyphosate in its product. There are: thousands of cases worldwide still waiting to be heard; global reports from extensive independent scientific research; the before mentioned court decisions and journalistic investigations about the dangers to human health from glyphosate that continue to flood the news.

For more information on these trials, see:

1. The Guardian articles on the cases associated with Mr. Dewayne Johnson, Mr. Edwin Hardeman and Mr. Paul Francois in France:
<https://www.theguardian.com/business/2018/sep/25/monsanto-dewayne-johnson-cancer-verdict>
<https://www.theguardian.com/business/2019/apr/10/edwin-hardeman-monsanto-trial-interview>
<https://www.theguardian.com/business/2019/apr/11/french-court-finds-monsanto-guilty-of-poisoning-farmer>
2. Comprehensive documentation associated with the Dewayne Johnson case provided by law firm Baum Hedland Aristei Goldman in California:

<https://www.baumhedlundlaw.com/toxic-tort-law/monsanto-roundup-lawsuit/dewayne-johnson-v-monsanto-company/#exhibits>
<https://usrtk.org/monsanto-papers/>
https://justicepesticides.org/en/juridic_case/dewayne-johnson-v-monsanto/

So, what do we want done in Bermuda?



Given the high incidence of various cancers and other health concerns in Bermuda and our inability to definitively say what causes most of them, would it not be wiser to use the precautionary approach to reduce the use of harmful chemicals?

In late 2017, the BUZZ made a comprehensive submission to the Minister responsible for the Environment calling for more protective measures in regard to pesticide use in Bermuda, including:

- The formal introduction of an Integrated Pest Management system (IPM) in Bermuda as a way to identify alternative options for the management of weeds and pests in Bermuda and to reduce our dependence on toxic products like pesticides.
- The establishment of a central importation and distribution centre that would provide improved statistics on the amount and type of pesticides imported and used on island.
- This central depot could also ensure that only trained personnel are able to purchase and handle these toxic products.
- The need to strengthen the link to the Ministry for Health (and Department Environmental Health) so that we can feel assured that our government is fully aware of exposure levels and health risks from environmental toxins, given that the Pesticide Safety Act 2009 is still not in force due to the absence of supporting regulations
- The extreme difficulty in making sense of the many and often conflicting reports on the safety of toxic products (like pesticides). Added to that is the pressure exerted by lobbyists and industry representatives who claim the safety of their products. Meanwhile, the level of disease and the correlation to the use of pesticides are both on the increase.

Most recently, in late 2018 and mid 2019 we again appealed to the current Minister for a complete ban of all glyphosate-based products in Bermuda. **We believe that such chemicals should not be permitted and we need a government with a commitment to reducing the health risks to our community and the environment by taking a stand to ban the products from Bermuda.** We are asking for your support for this stand.

To conclude, the hope is that the information provided in this article is enough to impress upon us all that the use of chemical products in the environment is often not the best way to address an issue. Choosing to use non-toxic alternatives will help to support your own health and the health of our community and environment. Individuals and government are urged to adopt a precautionary approach to the use of pesticides or other chemical products being used in the public domain. Assume harm will result unless there is reasonable certainty that it will not. To assume safety would be foolhardy.

“Every individual matters. Every individual has a role to play. Every individual makes a difference.” (Jane Goodall)