Research: Roundup Herbicide Toxicity Vastly Underestimated

By Sayer Ji

October 15, 2012

Glyphosate, the most well-known ingredient in the herbicide Roundup, has recently been the focus of an intense debate over whether or not it is dangerous, even carcinogenic, to those exposed to it through food and the environment.

Monsanto, the original creator and patent-holder of glyphosate, and of the most famous glyphosate formulation Roundup, has funded research denying the emerging glyphosate-cancer link, but the latest (and only known) long-term feeding study from an industry independent research group out of France indicates that the transgenic material within Roundup-Ready Monsanto corn, as well as Roundup itself, are highly carcinogenic, and should be banned to protect the millions who are already consuming it on a daily basis.

Glyphosate, however, is only one dimension of a complex toxicological problem. What is often overlooked is the role of adjuvants in glyphosate

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formulations like Roundup, which while being labeled "inert" or "non-active," are in no way neutral, and which amplify glyphosate toxicity far beyond what toxicological risk assessments presently are designed to ascertain.

**Glyphosate-Formulations Dramatically More Toxic than Glyphosate Alone**

Back in Feb. of 2012, the journal *Archives of Toxicology* published a shocking study showing that Roundup is toxic to human DNA even when diluted to concentrations 450-fold lower than used in agricultural applications.[i]

This effect could not have been anticipated from the known toxicological effects of glyphosate alone. The likely explanation is that the surfactant polyoxyethylene-amine within Roundup dramatically enhances the absorption of glyphosate into exposed human cells and tissue.

If this is true, it speaks to a fundamental problem associated with toxicological risk assessments of agrichemicals (and novel manmade chemicals in general), namely, these assessments do not take into account the reality of synergistic toxicologies, i.e. the amplification of harm associated with multiple chemical exposures occurring simultaneously.

"Inactive Ingredients" In Herbicide Formulations Are Actively Poisoning Us

But adjuvants in glyphosate formulations do not just increase the toxicity of glyphosate -- they are themselves highly toxic. Indeed, a study published in the journal *Toxicology* September, 2011 titled "Ethoxylated adjuvants of glyphosate-based herbicides are active principles of human cell toxicity," found 24 hour exposures on liver, embryonic and placental cell lines at concentrations as low as 1 ppm – a dose well within "acceptable" environmental and occupational doses – resulted in negative effects on cellular respiration and membrane integrity.[ii] The authors reported their findings as such:

*Altogether, these results challenge the establishment of guidance values such as the acceptable daily intake of glyphosate, when these are mostly based on a long term in vivo test of glyphosate alone. Since pesticides are always used with adjuvants that could change their toxicity, the necessity to assess their whole formulations as mixtures becomes obvious. This challenges the concept of active principle of pesticides for non-target species.*

What the consumer of GM-contaminated food must understand is that glyphosate, and the many insufficiently tested "inactive" ingredients sprayed on these foods, enter the body and have real, adverse effects that are cumulative, even if mostly subclinical. The only way we can be sure to reduce our exposure to these agrichemicals is through consciously refraining from consuming them. And how do we do that? Get the stuff labeled, and give the consumer a choice not to eat it.

**Vote with your fork by buying only organic food, whenever possible.**

**Resources**


Sayer Ji is an author, researcher, lecturer, and advisory board member of the National Health Federation.

http://www.greenmedinfo.com/blog/research-roundup-herbicide-toxicity-vastly-underestimated

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**Biotech’s Next Big Disaster: Seeds that Emit Multiple Pesticides**

By Jon Rappoport

May 13, 2013

www.nomorefakenews.com

Tom Laskawy, writing at Grist, points out how the next generation of GMOs is following in the track of present disasters:

“…the growing pest and weed problems for GMOs have caused farmers to turn to seeds that are coated with a different pesticide—a neonicotinoid. If that name rings a bell, it’s because these pesticides… have been implicated in the increasing epidemic of bee deaths.

“And that’s aside from the evidence that biotech’s ‘next big thing’—seeds that emit multiple pesticides—may be doomed to fail. An international team of researchers, including USDA and biotech scientists, found what they termed ‘cross-resistance’ to these pesticides in [predatory] bugs exposed to the next-generation GMO seeds. Evidence, in other words, that GMO seeds are hitting a bug-covered wall.” The seeds don’t knock out the plant pests.

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The Tombs of Buganda Kings at Kasubi constitute a site embracing almost 30 ha of hillside within Kampala district. Most of the site is agricultural, farmed by traditional methods. At its core on the hilltop is the former palace of the Kabakas of Buganda, built in 1882 and converted into the royal burial ground in 1884. Four royal tombs now lie within the Muzibu Azaala Mpanga, the main building, which is circular and surmounted by a dome. It is a major example of an architectural achievement in organic materials, principally wood, thatch, reed, wattle and daub. The site's main significance lies, however, in its intangible values of belief, spirituality, continuity and identity.

Outstanding Universal Value

Brief synthesis

The Tombs of Buganda Kings constitute a site embracing 26.8 hectares of Kasubi hillside within Kampala City. The site is the major spiritual centre for the Baganda where traditional and cultural practices have been preserved. The Kasubi Tombs are the most active religious place in the kingdom, where rituals are frequently performed. Its place as the burial ground for the previous four kings (Kabakas) qualifies it as a religious centre for the royal family, a place where the Kabaka and his representatives carry out important rituals related to Buganda culture. The site represents a place where communication links with the spiritual world are maintained.

Its spatial organization, starting from the border of the site marked with the traditional bark cloth trees, leading through the gatehouse, the main courtyard, and culminating in the large thatched building, housing the tombs of the four Kabakas, represents the best existing example of a Baganda palace/burial site.

At its core on the hilltop is the main tomb building, locally referred to as the "Muzibu-Azaala-Mpanga" which is a masterpiece of this ensemble. A tomb building has been in existence since the 13th century. The latest building was the former palace of the Kabakas of Buganda, built in 1882 and converted into the royal burial ground in 1884. Four royal tombs now lie within the Muzibu-Azaala-Mpanga.

The main tomb building, which is circular and surmounted by a dome, is a major example of an architectural achievement that was raised with use of vegetal materials comprised of wooden poles, spear grass, reeds and wattle. Its unusual scale and outstanding details bear witness to the creative genius of the Baganda and as a masterpiece of form and craftsmanship, it is an exceptional surviving example of an architectural style developed by the powerful Buganda Kingdom since the 13th Century.

The built and natural elements of the Kasubi Tombs site are charged with historical, traditional, and

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What are pesticides?
We use the term pesticide to cover a wide range of chemicals used to control insect pests (insecticides), plant diseases (fungicides), weeds (herbicides), rats (rodenticides) or other unwanted organisms.

Pesticides are one of the few groups of man-made chemicals that are designed to kill and deliberately released into the environment. You can tell this from their name - the ending -cide literally means ‘killer’.

Several pesticides were originally developed as nerve toxins to be used as instruments of war. When peace came, their manufacturers found a ready new market for these products as pest control agents. The insecticide DDT is probably the best-known pesticide. It was used in huge quantities for three decades after World War Two as a miracle cure for many insect pests in agricultural crops and against household and mosquito pests until the first signs began to appear that it could have harmful effects on many other animals. Rachel Carson published her famous book, “Silent Spring” in 1962 drew public attention to the fact that DDT was harming birds and lead to declines in their population. DDT has been banned for 20 years in Britain but because it breaks down so slowly and builds up in the fatty tissue of all animals, it has left a toxic legacy around the globe - traces of it can be found in polar bears and seals in the Arctic thousands of miles from where it was sprayed. Almost everyone on the planet has DDT in their body and it gets passed to babies in breast milk.

However, many other pesticides are far more ‘poisonous’ in immediate terms, what we term acutely toxic, as opposed to chronic effects that may take years before they turn into noticeable symptoms.

People often don't realise that many pesticides can also cause harm to human beings. Insecticides in the organophosphate and carbamate groups work by disrupting the nervous system. Unfortunately, the way our nervous system works is very similar to the way it works in insects and so we are vulnerable to the same harmful effects.

Take the example of chlorpyrifos, an insecticide used in a wide range of crops and in certain UK household antkiller products. Symptoms of chlorpyrifos poisoning in humans include headache, nausea, dizziness, muscle twitching, weakness, increased sweating and salivation. At very high exposure levels, the damage to the nervous system can lead to unconsciousness, convulsions, respiratory failure and death. Serious and fatal pesticide poisonings occur frequently in developing countries, especially among peasant farmers and farm workers who often handle these toxic chemicals without any form of protective clothing. Between 3-25 million people are estimated to experience some form of acute poisoning each year worldwide. In industrialised countries, farm workers must use protective equipment and there are restrictions on how insecticides like chlorpyrifos are handled so serious poisoning cases are much less common. Even so, chlorpyrifos is one of the major causes of pesticide poisoning in the US.

Long term and low dose effects
Low doses of nerve toxin pesticides can also have more subtle, longer term effects such as drowsiness,

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difficulty concentrating, impaired memory and delayed reaction times, slurred speech, depression and insomnia. These symptoms can be confused with other illnesses and it is almost impossible to prove 100% that pesticides are to blame, especially if a person was exposed in the past.

Chlorpyrifos has been widely used in American homes and growing suspicions of health problems, especially for children, who came into contact with minute traces in the air, on floors, carpets and even on toys, led to its ban for household purposes in 2001. Small amounts can also wreak havoc in the environment- less than a quarter litre spilled into a river in Sussex wiped out aquatic insects along a 20 km stretch and provoked mass fish deaths.

Other groups of pesticides don't cause acute poisoning in humans but may result in more subtle, longer term harm.

Weedkillers and fungicides target biological processes in plant and fungal tissues yet scientists have realised over the years that some of these may cause cancer or damage hormone and immune systems in humans. Although the EU has stricter rules nowadays on not permitting the most hazardous pesticides to be used, we still have more than 90 pesticides suspected to cause cancer in common use in Europe. The weedkiller paraquat, however, is acutely toxic-two men died in separate incidents in 2005 in the UK, one of whom accidentally drank paraquat that had been illegally stored in a soft drink bottle.

**Pesticides in our food - a daily dose of poison**

The amounts of pesticides that remains as residues in food are minuscule-sometimes only 1 millionth of a kilogramme. The official safety limits allowed in our daily intake are also incredibly small. Pro-pesticide groups say this is equivalent to a fraction of a teaspoonful in an Olympic swimming pool and we shouldn’t worry about such very low levels. This is misleading because many of the chemical messengers in our bodies function at precisely these minute quantities, of parts per million or even parts per billion.

**Scientists cannot say for sure that there is ever a “safe” level of pesticide residues in food.**

If you look at the UK government residue monitoring reports, they emphasise that two-thirds of our food does not contain residues. This can give an over-optimistic view because different kinds of food vary enormously in their level of contamination with pesticides. For example, all soft citrus fruit and 80% of apples sampled from British supermarkets and other shops during 2003-04 contained residues, over 75% of farmed fish samples contain residues, and even in daily staples like bread or potatoes you find residues turning up in at least half of the samples tested. There is no published information on our overall average daily intake levels of pesticides in food because it is too difficult or expensive to estimate.

The government and supermarkets samples include UK-grown foodstuffs as well as imported. In some cases, British produce is “cleaner” than imported stuff, sometimes it is just as contaminated. People often think that fruits or vegetables from developing countries are full of pesticides because controls are weak compared with those for European farmers, but this is not necessarily true. The produce has to comply with the same maximum residue limits as UK and European produce. In tomatoes, for example, 100% of Turkish and South African and 66% of Moroccan samples were contaminated but Egyptian and Senegalese samples were residue free. These tests were conducted on only one, two or three samples from each country so it’s very hard to draw any firm conclusions. However, most government sampling is limited to dozens rather than hundreds of samples for any one foodstuff so we’re only looking at a tiny proportion of food on sale.

In other foods, pesticide residues are very rare- only 5 out of 1,401 samples of milk tested since 2000 contained residues. Carrots had a bad reputation some years ago and the government was advising us to peel carrots to reduce the chance of intake. Since 2002, fewer residues have been found, as farmers and supermarkets have made an effort to tackle the problem. You might want to check the data for the foods your family eats most often so you can decide whether to avoid the most contaminated produce or to buy organic for these categories.

**What are the health issues?**

The government and the pesticide industry generally rule out any possible risk to consumers from our daily intake of pesticides. The levels in the average British diet are certainly too low to cause serious acute poisoning, although a mild stomach upset is not out of the question. But over the last decade some scientists have raised warning bells about the effects of this long-term, low-dose intake, especially for young children.

Several studies concluded that daily consumption of tiny quantities of nerve toxin pesticides, like chlorpyrifos, may result in damage, sometimes permanent, to the developing brain and nervous system of young children. The findings worried the US authorities enough for them to add an extra ten-fold safety factor into their calculations of acceptable levels in food, to better protect children’s health. To date, European authorities have not made such a change in their residue legislation although
Roundup, an Herbicide, Could Be Linked To Parkinson's, Cancer and Other Health Issues

By Reuters
April 25, 2013

Heavy use of the world's most popular herbicide, Roundup, could be linked to a range of health problems and diseases, including Parkinson's, infertility and cancers, according to a new study.

The peer-reviewed report, published last week in the scientific journal Entropy, said evidence indicates that residues of "glyphosate," the chief ingredient in Roundup weed killer, which is sprayed over millions of acres of crops, has been found in food.

Those residues enhance the damaging effects of other food-borne chemical residues and toxins in the environment to disrupt normal body functions and induce disease, according to the report, authored by Stephanie Seneff, a research scientist at the Massachusetts Institute of Technology, and Anthony Samsel, a retired science consultant from Arthur D. Little, Inc. Samsel is a former private environmental government contractor as well as a member of the Union of Concerned Scientists.

"Negative impact on the body is insidious and manifests slowly over time as inflammation damages cellular systems throughout the body," the study says.

We "have hit upon something very important that needs to be taken seriously and further investigated," Seneff said.

Environmentalists, consumer groups and plant scientists from several countries have warned that heavy use of glyphosate is causing problems for plants, people and animals.

The EPA is conducting a standard registration review of glyphosate and has set a deadline of 2015 for determining if glyphosate use should be limited. The study is among many comments submitted to the agency.

Monsanto is the developer of both Roundup herbicide and a suite of crops that are genetically altered to withstand being sprayed with the Roundup weed killer.

These biotech crops, including corn, soybeans, canola and sugar beets, are planted on millions of acres in the United States annually. Farmers like them because they can spray Roundup weed killer directly on the crops to kill weeds in the fields without harming the crops.

Roundup is also popularly used on lawns, gardens and golf courses.

Monsanto and other leading industry experts have said for years that glyphosate is proven safe, and has a less damaging impact on the environment than other commonly used chemicals.

Jerry Steiner, Monsanto's executive vice president of sustainability, reiterated that in a recent interview when questioned about the study.

"We are very confident in the long track record that glyphosate has. It has been very, very extensively studied," he said.

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Of the more than two dozen top herbicides on the market, glyphosate is the most popular. In 2007, as much as 185 million pounds of glyphosate was used by U.S. farmers, double the amount used six years ago, according to Environmental Protection Agency (EPA) data.


Lethality of Roundup 'Weedkiller' Extends Beyond Plants to Humans, Study Suggests

By Sayer Ji

April 25, 2013

A shocking new study finds that glyphosate, the active ingredient in Roundup herbicide, "...may be the most biologically disruptive chemical in our environment," capable of contributing to a wide range of fatal human diseases.

A new report published in the journal *Entropy* links the active ingredient in Roundup herbicide known as glyphosate with a wide range of fatal diseases.[i]

Glyphosate is the world's most popular herbicide and is designed to kill all but genetically modified "Roundup Ready" plants, such as GM corn, soy, beet, cottonseed and canola. Over 180 million pounds of the chemical are now applied to US soils each year,[ii] and while agrichemical manufacturers and government regulators have considered it 'relatively safe,' an expanding body of biomedical research indicates that it may cause over 30 distinct adverse health effects in exposed populations at far lower concentrations than used in agricultural applications.

The researchers identified the inhibition and/or disruption of cytochrome P450 (CYP) enzymes as a hitherto overlooked mechanism of toxicity associated with glyphosate exposure in mammals.

CYP enzymes are essential for detoxifying xenobiotic chemicals from the body. Glyphosate therefore enhances the damaging effects of other food borne chemical residues and environmental toxins. The researchers also showed how interference with CYP enzymes acts synergistically with disruption of the biosynthesis of aromatic amino acids by gut bacteria (e.g. tryptophan), as well as impairment in serum sulfate transport, a critical biological system for cellular detoxification (e.g. transulfuration pathway which detoxifies metals).

These effect, according to the researchers, can contribute to causing or worsening "...most of the diseases and conditions associated with a Western diet which include gastrointestinal disorders, obesity, diabetes, heart disease, depression, autism, infertility, cancer and Alzheimer's disease."

This new report may help to explain why over 30 adverse health effects associated with Roundup herbicide exposure have been identified in the peer-reviewed and published literature so far. The full report in PDF form can be obtained here. Please help us spread this information, as well as our Roundup Toxicity Research and GMO Research pages, by sharing them with other concerned individuals and groups.

Resources


[ii] Huffingtonpost.com, Roundup, An Herbicide, Could Be Linked To Parkinson's, Cancer And Other Health Issues, Study Shows

http://www.greenmedinfo.com/blog/lethality-roundup-weedkiller-may-extend-beyond-plants-humans-study-shows

Insecticides Modified in GM Corn Polluting U.S. Waters

By Elizabeth Renter

August 6, 2012

Corn, a crop most likely to be genetically modified – with 70 percent of corn engineered simply to drown in Monsanto’s best-selling herbicide Roundup - is casting off its GMO contaminants into surrounding waterways, and likely making it into your drinking water. According to researchers, the insecticides modified into the corn are

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Across the Midwestern corn belt, a familiar battle has resumed, hidden in the soil. On one side are tiny, white larvae of the corn rootworm. On the other side are farmers and the insect-killing arsenal of modern agriculture.

We've reported on earlier phases of this battle: The discovery of rootworms resistant to one type of genetically engineered corn, and an appeal from scientists for the government to limit the use of this new corn to preserve the effectiveness of its protection against rootworm.

It appears that farmers have gotten part of the message: Biotechnology alone will not solve their rootworm problems. But instead of shifting away from those corn hybrids, or from corn altogether, many are doubling down on insect-fighting technology, deploying more chemical pesticides than before. Companies like Syngenta or AMVAC-Chemical that sell soil insecticides for use in corn fields are reporting huge increases in sales: 50 or even 100 percent over the past two years.

This is a return to the old days, before biotech seeds came along, when farmers relied heavily on pesticides. For Dan Steiner, an independent crop consultant in northeastern Nebraska, it brings back bad memories. "We used to get sick [from the chemicals]," he says.

"Because we'd always dig [in the soil] to see how the corn's coming along. We didn't wear the gloves and everything, and we'd kind of puke in the middle of the day. Well, I think we were low-dosing poison on ourselves!"

For a while, biotechnology came to his rescue. Biotech companies such as Monsanto spent many millions of dollars creating and inserting genes that would make corn plants poisonous to the corn rootworm but harmless to other creatures.

The first corn hybrids containing such a gene went on sale in 2003. They were hugely popular, especially in places like northeastern Nebraska, where the rootworm has been a major problem. Sales of soil insecticides fell. "Ever since then, I'm like, hey, we feel good every spring!" says Steiner.

But all along, scientists wondered how long the good times would last. Some argued that these genes — a gift of nature — were being misused. (For a longer explanation, read my post from two years ago.)

Those inserted genes, derived from genes in a strain of the bacterial *Bacillus thuringiensis*, worked well for a while. In fact, the Bt genes remain a rock-solid defense against one pest, the European corn borer.

In parts of Illinois, Iowa, Minnesota and Nebraska, though, farmers are running into increasing problems with corn rootworms.

"You never really know for sure, until that big rain event with the strong wind, and then the next morning the phone starts ringing [and people ask]: 'What's going on out there?'" says Steiner.

Entire hillsides of corn, with no support from their eaten-away roots, may be blown flat.

Monsanto has downplayed such reports, blaming extraordinary circumstances. But in a half-dozen universities around the Midwest, scientists are now trying to figure out whether, in fact, the Bt genes have lost their power.

At the University of Nebraska, entomologist Lance Meinke is turning colonies of rootworms loose on potted corn plants that contain different versions of the anti-rootworm gene, to see how well they survive.

The larvae get to feed on the corn roots for about two weeks. The soil from each pot then is dumped into a

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David Wangila points to a tiny rootworm larva in the soil surrounding the roots of a corn plant in his laboratory. Dan Charles/NPR

kind of steel container. If the larvae are still alive, a bright light will drive them into little glass jars filled with alcohol. "They try to escape from the heat," says David Wangila, a graduate student who is managing this experiment.

If the rootworm-fighting genes in the corn are working well, no larvae should emerge.

But some have. Wangila points to one of the little glass jars. Inside, there are three nice plump corn rootworm larvae.

This is not good. Those insects, originally collected from a cornfield in Nebraska, were feeding on corn that contained the first rootworm-fighting gene that Monsanto introduced ten years ago. Technically, it's known as the Cry 3Bb gene.

Meinke and Wangila will compare the survival rate of these rootworms with others that have never been exposed to Bt. They're looking for signs that rootworms in the corn fields of Nebraska have evolved resistance to genetically engineered crops.

An identical experiment in Iowa, carried out more than a year ago, found corn rootworms resistant to the Cry 3Bb gene.

Nobody knows how widely those insects have spread, but farmers aren't waiting to find out. Some are switching to other versions of biotech corn, containing anti-rootworm genes that do still work. Others are going back to pesticides.

Steiner, the Nebraska crop consultant, usually argues for another strategy: Starve the rootworms, he tells his clients. Just switch that field to another crop. "One rotation can do a lot of good," he says. "Go to beans, wheat, and oats. It's the No. 1 right thing to do."

Insect experts say it's also likely to work better in the long run.

Meinke, who's been studying the corn rootworm for decades, tells farmers that if they plant just corn, year after year, rootworms are likely to overwhelm any weapon someday.

The problem, Meinke says, is that farmers are thinking about the money they can make today. "I think economics are driving everything," he says. "Corn prices have been so high the last three years; everybody is trying to protect every kernel. People are just really going for it right now, to be as profitable as they can."

As a result, they may just keep growing corn, fighting rootworms with insecticides — and there's a possibility that those chemicals will eventually stop working, too.


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being detected in streams up to 500 meters away from corn farms, and quite possibly further.

The research was conducted in the states of Iowa, Illinois, and Indiana, where corn fields are abundant. Scientists found the bacterial protein washed off the corn and directly into the streams. While they won’t say for certain what this means for human health, the consensus is that it can’t be good.

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According to U.K.’s Independent, U.S. corn has a gene from the Bacillus thuriengensis (BT) bacterium inserted into it to repel bugs. This gene produced the Cry1Ab protein, which “has insecticidal properties.” It’s this protein that is being found in the water system.

It’s believed the protein is making its way to the water because of the practice of leaving plant material on the field until the next season. This “no till” method is used because it prevents erosion, but it also provides an opportunity for the potentially dangerous protein to be washed away.

And while the GM corn is a culprit in polluting our waters, research has pointed to GMO farming in general and chemicals like glyphosate for being significant causes of water pollution. One explosive study confirmed that glyphosate, the active ingredient residing in the ever-so-popular Roundup product from Monsanto, is making its way into groundwater across the nation through widespread contamination of aquifers, wells, and springs.

Needless to say, this isn’t the first time Bt has been in the news. This spring we reported on a study linking Bt insecticide to the death of human kidney cells.

Despite this and other troubling news about GMO crops, the United States remains steadfast in its protection against agri-giants like Monsanto, preferring to please them rather than protect the people.

In 2009, more than 85% of American corn crops were genetically modified, but that number has likely increased since that time. All the while, other countries in Europe don’t even allow the GMO corn or at the very minimum label food sources that contain GMO ingredients. No similar protections are provided in the United States.

http://naturalsociety.com/insecticides-gm-corn-polluting-water/

New Study Proves Bt Toxins in GMOs Toxic to Mammalian Blood

According to a new study, the ‘Cry’ toxins that Monsanto’s GMO crops have been genetically modified to produce are a lot more toxic to mammals than previously thought, primarily to the blood.

By Fritz Kreiss

May 7, 2013
Activist Post

Dr. Mezzomo and his team from the Department of Genetics and Morphology at the Institute of Biological Sciences, University of Brasilia recently performed and published a study done involving testing Bacillus thuringensis toxin (Bt toxin) on swiss albino mice. This toxin is the same one built into Monsanto’s GMO Bt crops such as corn and soy as a pesticide.

While Bt toxin has been used quite safely in conventional and organic farming as an occasional spray used when dealing with a pest problem, now it has been engineered to be produced by and present throughout the inside of every cell and intercellular space of the plants themselves, which is why they chose to undertake the study.

It should also be noted that as bacteria use lateral transference of genetic material, making it a possibility for this genetic material to become part of the human body’s bacterial bouquet that we depend on for our health (our bodies contain more bacteria cells than human ones by number).

…advances in genetic engineering promise the expression of multiple Cry toxins in Bt-plants, known as gene pyramiding. Therefore, studies on non-target species are requirements of international protocols to verify the adverse effects of these toxins, ensuring human and environmental biosafety.

Due to its growing use in agricultural activities, Bt presence has already been detected in different environmental compartments such as soil and water. Consequently, the bioavailability of Cry proteins has increased, and for biosafety reasons their adverse effects might be studied, mainly for non-target organisms. Studies are therefore needed to evaluate Bt toxicity to non-target organisms; the persistence of Bt toxin and its stability in aquatic environments; and the risks to humans and animals exposed to potentially toxic levels of Bt through their diet.

Thus, we aimed to evaluate, in Swiss albino mice, the hematotoxicity and genotoxicity of four Bt spore-crystals…

The scientists already knew that Bt toxin was very toxic and potentially deadly at levels above 270 milligrams per kilogram (basically ppm), so they instead tested levels ranging from 27mg/kg, 136mg/kg, and 270mg/kg for one to seven days (each of the Cry toxins were separated out and tested individually to maximize accuracy and total info). It was quite clear right off the bat that these Cry toxins were quite hemotoxic even at the lowest level of 27mg/kg administered only one time and one day as they clearly had damaged the blood,

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particularly in reference to red blood cells. The quantity and size of the erythrocytes (RBCs) were both significantly reduced, as was the overall levels of hemoglobin for which oxygen to attach to.

All major factors regarding RBCs demonstrated some level of damage present for all levels of toxin administered and across all Cry proteins, although there were some clear variances present between different proteins and levels for certain factors. The white blood cell count was also quite noticeably raised, and as expected it dramatically increased depending on the duration the subject was tested for.

The tests clearly demonstrated that Cry proteins were cytotoxic to bone marrow cells, accounting for a portion of the measured effects. It should also be noted that a previous study found that these proteins caused hemolysis (they killed blood cells) in vitro, particularly seeming to target the cell membranes of red blood cells.

Cry1Ab (the protein produced in common Bt corn and soy) induced microcytic hypochromic anemia in mice, even at the lowest tested dose of 27 mg/Kg, and this toxin has been detected in blood of non-pregnant women, pregnant women and their fetuses in Canada, supposedly exposed through diet [34]. These data, as well as increased bioavailability of these MCA in the environment, reinforce the need for more research, especially given that little is known about spore crystals’ adverse effects on non-target species.

While Bt toxin is not known to bioaccumulate in fat cells and internal organs, it is of note that the study demonstrated clearly that there was a significant increase in measurable negative effects of the toxin as time progressed especially concerning the higher doses. Also of note was the increased inflammatory response, while it was quite minor, the scientists consider it to be statistically significant due to the intricacies of their chosen test subjects’ biology. No measurable genotoxicity was found.

The full results of the study and a more detailed explanation can be found at, along with full citations for this article:

Continued from page 2 – Biotech’s Next Big Disaster: Seeds that Emit Multiple Pesticides

Yet the venerable journal Nature recently urged patience, because just over the next hill, the biotech giants will surely succeed in bringing us better GMO crops.

This reveals an underlying assumption about technology: when scientists discover a new way of doing things, it can never be retracted; it will eventually work well; improvements will come.

That false assumption sustains a tremendous amount of false science, as well as profits, of course, for the companies involved.

Just because medical researchers can come up with new chemo drugs that kill cells and destroy immune systems, it doesn’t mean they have to.

Despite failures along every front of GMO-crop production, despite the fact that predictions of higher crop yields and reduced use of pesticides and herbicides have failed to materialize, Monsanto pushes on.

Monsanto lies and pretends their work is an enormous success. Their researchers, many of whom know the catastrophic failure they are dealing with, nevertheless keep going, keep telling themselves that this is science, and therefore it will ultimately succeed.

Translation: The seven billion people of earth are the guinea pigs in a vast corporate experiment.

Technocrats who envision trans-humans, a combine of brain and computerized brain, pin faith on the idea that, since brains can be hooked up to machines, they should be. It’s “scientific progress,” and therefore it has to happen.

All this used to be called scientism, a massive overreach of misplaced faith, but now the word is largely defunct. It was too accurate. It nailed the obsession and showed how crazy it was.

Years ago, I was invited to give a lecture to an atheist group in Los Angeles. The topic was HIV research, because I had written a book about it, AIDS INC. I described the line of HIV research, and made a detailed case for the fact that researchers had never proved HIV caused a condition that was being called AIDS.

My analysis was met with strong opposition. The group was unhappy.

No problem. But it turned out their unhappiness was based on the notion that I was attacking science itself. And since they believed that’s what I was doing, they
Continued from page 11- Biotech’s Next Big Disaster: Seeds that Emit Multiple Pesticides

were angry because, get this, if I was against science, I must be for God. And they were atheists.

Therefore, I had to be wrong.

Their reaction mirrored 19th century attitudes about the rise of science. Its proponents felt they’d finally found an antidote to religion, and therefore, anyone who criticized science on any terms (e.g., flawed reasoning, bad data, bogus experiments) must be demanding a return to the Church, the Inquisition, and burning at the stake.

In the second half of the 20th century, a new class of people came into being. Amateurs who wanted to pretend they were scientific thinkers. Even though they knew nothing about what really went on in laboratories, they could spout a few pseudo-scientific truths and win friends and influence people at cocktail parties and academic confabs. They were “up on the latest developments.”

More and more, this also became the m.o. in media. Reporters, broadcasters, anchors, government spokespeople, and pundits issued proclamations about science, without in fact having a clue about the truth or falsity of what they were saying.

We saw this (and still do), for example, in the area of so-called climate science. Everyone is now an expert on global warming and its imminent threat to the planet. The evidence is “settled.” Well, that’s what the president said, so it must be right.

After all, he personally knows all there is to know about methods of compiling historical temperature records, about alternate periods of cooling and warming, about computer modeling, about the mathematics of climate prediction.

Through cutouts, the White House has recently launched a campaign to defame anyone who doubts or questions or criticizes the manmade warming hypothesis. This is science by PR and intimidation.

The very best medical researchers assured us that Swine Flu was an emerging pandemic. In the spring of 2009, on the basis of 20 cases of Swine Flu, and after changing the very definition of “pandemic,” so it no longer needed to include “widespread death and devastation,” the World Health Association declared Swine Flu a level 6 pandemic, the most dangerous threat level.

Eventually, it turned out that Swine Flu was far less significant than ordinary seasonal flu. But no meacul-

pas emerged. No one admitted the hoax. No one stepped up and confessed.

It was science, and science (and profits) had to be protected, even and especially if it was wrong.

Many of these science projects are designed, at the highest level, as ops. The lies are told from the top, the deceptions are arranged. But much, much support is given, at lower levels, by people who swallow generalities about science.

They entertain delusions about science as a continuous march of progress which shouldn’t be interrupted. They will swear up and down they’re defending rational thought, logic, and the experimental method, when in fact they’re merely mouthing sentiment and propaganda.

Monsanto, like a stage magician working a cheap club in Vegas, says, “Look! We can insert genes in plants! Isn’t that incredible?”

And the rubes in the audience, enchanted by the trick, applaud, ready to support all the coming variations. For their part, these yokels only want to be able to say they’re on the cutting edge of science.

Lower, not higher crop yields? Nutritionally deficient food? Increased, not decreased use of pesticides and herbicides? Superweeds that don’t die under the assault of Roundup, as advertised, but instead thrive and spread? Health problems for people consuming GMO food? Who cares? It’s the magic trick that counts.

They can insert genes in plants. No one could do that before. It’s got to be a good thing. You want proof? Now they can make the plant exude more than one pesticide. What a feat.

Let’s eat.

For those who continue to parrot the company/government line that there is no difference between GMO and conventional crops, and claim “that’s good science,” here are smoking gun data from Monsanto’s own researchers.

The data were uncovered by science writer Barbara Keeler in 2000. Keeler published pieces in the Whole Life Times and the LA Times. The Whole Life Times piece was titled: “Buried Data in Monsanto’s Study on Roundup Ready Beans.”

Keeler discovered that, in 1994, when Monsanto submitted studies to the FDA, to win approval for GMO soybeans, highly significant data were hidden.

Roundup Ready (RR) Monsanto beans contained 29% less choline than conventional non-GMO beans.

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Continued from page 12 - Biotech’s Next Big Disaster: Seeds that Emit Multiple Pesticides

RR beans contained “27% more trypsin inhibitor, an allergen that inhibits protein digestion, can retard growth in animals fed raw soybeans, and has been connected to enlarged cells in rat pancreases.”

In data Monsanto failed to submit to the FDA, from its Puerto Rico field trials, RR beans “were significantly lower in protein and the amino acid phenylalanine.”

In retoasted RR soy meal, “levels of allergens called lectins…almost doubled the levels [found] in controls [non-GMO meal].”

In other words, there was quite enough evidence, in 1994, to halt the whole FDA approval process of Monsanto soy. It was there in Monsanto’s own studies. And it was ignored and buried.

Now new biotech masterpieces are on the way. Plants that emit multiple pesticides. We’re supposed to believe this is good science that will do no harm.

We’re in the technological age, and it’s all wonderful, and because we’re rational people, we should jump on the bandwagon.

http://jonrappoport.wordpress.com/2013/05/14/biotechs-next-big-disaster/

Continued from page 5 – Pesticides Issues in the Food Chain

the European Commission acknowledged for the first time in 2003 that some nerve toxin residue levels found occasionally in certain fruits and vegetables could pose a real health risk to small children.

Another concern about the long-term effects of certain pesticides in food is cancer. We cannot prove a definite link between pesticide intake and cancer; however, the authorities make decisions on whether to license a particular pesticide or not taking into consideration results from laboratory animals if these suggest it might cause cancer. If so, then they will not approve products that could possible cause one case of cancer per million people. One American study of residue levels suggested that children under five could rapidly build up their cancer risk from residues in food in the first few years of life as their food intake is very different from that of adults.

Other studies suggest that low-dose regular exposure to pesticides in food, drink and the air in our homes could be related to behavioural problems which are becoming more common in children, such as hyperactivity and attention deficit disorder, as well as memory and learning difficul-

Why PAN UK isn’t happy with government reassurances

(a) Safety assessments don’t properly protect vulnerable groups

One of the main concerns is that the way that the risk from pesticides are calculated looks mainly at your average, healthy, 60kg man. Children under five may be at much higher risk than adults, because they eat three to four times more food per kilo of their body weight than an average adult. Their exposure to harmful pesticides can therefore be much greater, especially when eating certain foods. Some of the most frequently contaminated and highest pesticide residue levels are found in pears, apples, oranges and bananas -precisely the foodstuffs we favour for young children, although the government does consider children’s weight in its assessment. But the fact that children are also far more sensitive to damage from pesticides because their organs are still developing isn’t factored into the equations. The government is looking more closely at pesticides consumed in different kinds of British diet (vegetarian, the elderly, different ethnic groups, etc.) but to date “safety” limits have not considered the most vulnerable groups- the unborn child, pregnant and breast-feeding women and the sick.

The amounts of residues can vary widely between one fruit and another but in testing the procedure is to blend together a sample of 10 different apples and take the average from the mixture, then add a factor to consider the possible variation. This may not be enough to protect children- a recent UK study calculated that every day between 10-226 British under-fives could be eating more than the “safety” limit for a single day’s intake of certain nerve toxin pesticides just by eating a single apple or pear with high residue levels This worrying scenario was calculated for children eating different amounts of apples- not for just for apple addicts!

(b) Are we doing enough testing to really get the picture?

What you find depends on what you look for. If you’re not monitoring very much, then you might not find very much. While only about 200 different pesticides can be used on British crops, worldwide over 800 may be sprayed on crops and we eat a lot of imported food. Yet

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the UK government only tests foodstuffs for a maximum of 150 pesticides, often it’s a lot fewer.

We also have one of the lowest rates of residue testing in the whole of Europe in terms of number of samples per head of population. The Danish government tests five times as many food samples per person in their population than we do so maybe it’s not surprising that they find a higher percentage of Danish food is contaminated. The UK government only looks at a selected number of foods each year, so we don’t have year on year data for most foods to show whether residue trends are going up or down.

The exceptions are bread, milk and potatoes which are tested every year, but, again, we don’t sample enough to get an idea of how much pesticide we consume even on these daily staples.

(c) What happens when we eat food with a mixture of different residues? We really have no idea of how the cocktail of different pesticides consumed in our diet interact once inside the body. Scientists do know that the potency of the mixture of some toxic chemicals can be very much higher than just adding up the effect of the individual compounds themselves- this is particularly worrying for the group of pesticides that act in similar ways on the nervous system. The US system now takes this into account when setting safety levels but we’re lagging behind in Europe. Pesticide mixtures can also cause some nasty surprises- scientists discovered that neither the weedkiller paraquat nor the fungicide maneb alone had any effect on the brain function of mice in the laboratory. But when they put them together, they saw damage similar to the symptoms of Parkinson’s disease. These kind of interactions are not considered at all in government safety assessments and there is no limit set for total daily intake of pesticides from all food sources.

(d) As long as residues are below the legal limit, there’s no problem?
The authorities always stress that the vast majority of food sampled does not exceed the legal limits for particular pesticides in particular foodstuffs (these are called maximum residue levels). This means that government considers it acceptable to consume very small doses of pesticides every day as part of a daily diet. The government also reassures us that these maximum residue levels are way below established safety limits but this is not always true. We’ve looked at the data and found that for 26 different pesticides which may be sprayed on apples, a toddler eating an apple containing a residue at the legal limit would exceed the government’s own level of what is considered “safe” to eat in one day’s intake of apples.

Across Europe, governments do aim to re-assess current legal limits to make sure there is no chance of eating more than the daily safety limit but the process is painfully slow. In the meantime, we are exposed to a daily cocktail of dozens of different pesticides in our food, many of which are known to cause long-term damage to different systems of the human body. Nobody has any real idea of how much pesticide the average British school child, for example, is consuming every day in their food and drink, or how this dose of poison might affect children’s development. And we don’t consider whether they might also be exposed to pesticides applied at school, at home or in public places, all adding to the build up of toxic contamination. It’s time to look much more closely at our daily diet of pesticides and to demand action from our government and food and farming companies to take these hidden ingredients out of the menu!

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Scientists link Pesticides & Biodiversity Loss

By GroundTruth

July 1, 2013

Many scientists rank biodiversity loss very high on their list of urgent global concerns. Chemical contaminants have long been understood as an important driver, but empirical evidence on a large scale has been sparse.

A new study published in the Proceedings of the National Academy of Sciences provides compelling data to fill this gap. Researchers found that biodiversity dropped in pesticide-laden streams in three countries: Germany, France and Australia.

The study examines biological diversity data at both the species and taxonomic family level, and groups the stream sites into three “contamination categories” according to pesticide levels found through monitoring.

Both family and species biodiversity decreased significantly with increased pesticide contamination.

Biodiversity loss in perspective

Five great extinction events have reshaped earth in the past 439 million years, each wiping out between half and 95% of planetary life. The most recent was the killing off of dinosaurs. Today, scientists tell us, we're living through a sixth great cataclysm.

Seven in ten biologists believe that today's trajectory toward mass extinction poses an even greater threat to humanity than the global warming which contributes to it. So the value of studies identifying drivers of the trend cannot be overstated.

This most recent research used a “species-at-risk” indicator in the analysis, tagging species that previous studies have identified as particularly susceptible to pesticides. As toxicity increased, so did the proportion of the sensitive species adversely impacted, in both Europe and Australia.

Sites were screened for other environmental factors that might affect species diversity, and a second line of analysis was used to determine whether other water quality factors could be adversely affecting biodiversity.

The researchers found no consistent link to other indicators, leaving pesticide contamination as the main driver of biodiversity loss.

Prioritizing action on pesticides

The authors called for more protective standards — and for more ecotoxicology investigations to cover large-scale pesticide applications, as these are most relevant to policy and real-world impacts.

“The measurement of the environmental concentrations of pesticides is difficult and expensive due to their episodic and low-level exposure and the multitude of substances. Therefore, the actual effects of pesticides can easily be misattributed to other... drivers... which are better understood and can be more easily investigated.”

We know that pesticide drift and residues on our food are major routes of exposure that pose potential harms to human health. The fact that pesticides are bad for other organisms comes as no surprise.

The question is, just how much evidence do we need linking pesticides to broad ecological harms before we begin the wholesale shift to safer alternatives?

News Releases from Headquarters (EPA)

Release Date: May 28, 2013

Wal-Mart Pleads Guilty To Federal Environmental Crimes And Civil Violations And Will Pay More Than $81 Million / Retailer admits violating criminal and civil laws designed to protect water quality and to ensure proper handling of hazardous wastes and pesticides

Continued on page 16
WASHINGTON – Wal-Mart Stores Inc. pleaded guilty today in cases filed by federal prosecutors in Los Angeles and San Francisco to six counts of violating the Clean Water Act by illegally handling and disposing of hazardous materials at its retail stores across the United States. The Bentonville, Ark.-based company also pleaded guilty today in Kansas City, Mo., to violating the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) by failing to properly handle pesticides that had been returned by customers at its stores across the country.

As a result of the three criminal cases brought by the Justice Department, as well as a related civil case filed by the U.S. Environmental Protection Agency (EPA), Wal-Mart will pay approximately $81.6 million for its unlawful conduct. Coupled with previous actions brought by the states of California and Missouri for the same conduct, Wal-Mart will pay a combined total of more than $110 million to resolve cases alleging violations of federal and state environmental laws.

According to documents filed in U.S. District Court in San Francisco, from a date unknown until January 2006, Wal-Mart did not have a program in place and failed to train its employees on proper hazardous waste management and disposal practices at the store level. As a result, hazardous wastes were either discarded improperly at the store level – including being put into municipal trash bins or, if a liquid, poured into the local sewer system – or they were improperly transported without proper safety documentation to one of six product return centers located throughout the United States.

“By improperly handling hazardous waste, pesticides and other materials in violation of federal laws, Wal-Mart put the public and the environment at risk and gained an unfair economic advantage over other companies,” said Ignacia S. Moreno, Assistant Attorney General for the Justice Department’s Environment and Natural Resources Division. “Today, Wal-Mart acknowledged responsibility for violations of federal laws and will pay significant fines and penalties, which will, in part, fund important environmental projects in the communities impacted by the violations and help prevent future harm to the environment.”

“Federal laws that address the proper handling, storage and disposal of hazardous wastes exist to safeguard our environment and protect the public from harm,” said André Birotte Jr., the U.S. Attorney for the Central District of California. “Retailers like Wal-Mart that generate hazardous waste have a duty to legally and safely dispose of that hazardous waste, and dumping it down the sink was neither legal nor safe. The case against Wal-Mart is designed to ensure compliance with our nation’s environmental laws now and in the future.”

“As one of the largest retailers in the United States, Wal-Mart is responsible not only for the stock on its shelves, but also for the significant amount of hazardous materials that result from damaged products returned by customers,” said Melinda Haag, U.S. Attorney for the Northern District of California. “The crimes in these cases stem from Wal-Mart’s failure to comply with the regulations designed to ensure the proper handling, storage, and disposal of those hazardous materials and waste. With its guilty plea today, Wal-Mart is in a position to be an industry leader by ensuring that not only Wal-Mart, but all retail stores properly handle their waste.”

“This tough financial penalty holds Wal-Mart accountable for its reckless and illegal business practices that threatened both the public and the environment,” said Tammy Dickinson, U.S. Attorney for the Western District of Missouri. “Truckloads of hazardous products, including more than 2 million pounds of pesticides, were improperly handled under Wal-Mart’s contract. Today’s criminal fine should send a message to companies of all sizes that they will be held accountable to follow federal environmental laws. Additionally, Wal-Mart’s community service payment will fund important environmental projects in Missouri to help prevent such abuses in the future.”

“The FBI holds all companies, regardless of size, to the same standards,” said FBI Special Agent in Charge David J. Johnson of the San Francisco Field Office. “We will continue to work closely with our law enforcement partners to ensure there is a level playing field for all businesses and that everyone follows the rules.”

“Today Wal-Mart is taking responsibility for violating laws that protect people from hazardous wastes and chemicals,” said Cynthia Giles, assistant administrator for EPA’s Office of Enforcement and Compliance Assurance. “Walmart is committing to safe handling of hazardous wastes at all of its facilities nationwide, and action that will benefit communities across the country.”

Wal-Mart owns more than 4,000 stores nationwide that sell thousands of products which are flammable, corrosive, reactive, toxic or otherwise hazardous under federal law. The products that contain hazardous materials include pesticides, solvents, detergents, paints, aerosols and cleaners. Once discarded, these products are considered hazardous waste under federal law.

Wal-Mart pleaded guilty this morning in San Francisco.
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to six misdemeanor counts of negligently violating the Clean Water Act. The six criminal charges were filed by the U.S. Attorney’s Office in Los Angeles and San Francisco (each office filed three charges), and the two cases were consolidated in the Northern District of California, where the guilty pleas were formally entered before U.S. Magistrate Judge Joseph C. Spero. As part of a plea agreement filed in California, Wal-Mart was sentenced to pay a $40 million criminal fine and an additional $20 million that will fund various community service projects, including opening a $6 million Retail Compliance Assistance Center that will help retail stores across the nation learn how to properly handle hazardous waste.

In the third criminal case resolved today, Wal-Mart pleaded guilty in the Western District of Missouri to violating FIFRA. According to a plea agreement filed in Kansas City, beginning in 2006, Wal-Mart began sending certain damaged household products, including regulated solid and liquid pesticides, from its six return centers to Greenleaf LLC, a recycling facility located in Neosho, Mo., where the products were processed for reuse and resale. Because Wal-Mart employees failed to provide adequate oversight of the pesticides sent to Greenleaf, regulated pesticides were mixed together and offered for sale to customers without the required registration, ingredients, or use information, which constitutes a violation of FIFRA. Between July 2006 and February 2008, Wal-Mart trucked more than 2 million pounds of regulated pesticides and additional household products from its various return centers to Greenleaf. In November 2008, Greenleaf was also convicted of a FIFRA violation and paid a criminal penalty of $200,000 in 2009.

Pursuant to the plea agreement filed in Missouri and accepted today by U.S. District Judge John T. Maughmer, Wal-Mart agreed to pay a criminal fine of $11 million and to pay another $3 million to the Missouri Department of Natural Resources, which will go to that agency’s Hazardous Waste Program and will be used to fund further inspections and education on pesticide regulations for regulators, the regulated community and the public. In addition, Wal-Mart has already spent more than $3.4 million to properly remove and dispose of all hazardous material from Greenleaf’s facility.

In conjunction with today’s guilty pleas in the three criminal cases, Wal-Mart has agreed to pay a $7.628 million civil penalty that will resolve civil violations of FIFRA and Resource Conservation and Recovery Act (RCRA). In addition to the civil penalties, Wal-Mart is required to implement a comprehensive, nationwide environmental compliance agreement to manage hazardous waste generated at its stores. The agreement includes requirements to ensure adequate environmental personnel and training at all levels of the company, proper identification and management of hazardous wastes, and the development and implementation of Environmental Management Systems at its stores and return centers.

Compliance with this agreement is a condition of probation imposed in the criminal cases. The criminal cases announced today are a result of investigations conducted by the FBI and the EPA, which received substantial assistance from the California Department of Substance and Toxics Control, and the Missouri Department of Natural Resources.

In Missouri, the case was prosecuted by Deputy U.S. Attorney Gene Porter and ENRD Senior Trial Attorney Jennifer Whitfield of the Environmental Crimes Section of the Environment and Natural Resources Division. In California, the cases were prosecuted in Los Angeles by Assistant U.S. Attorney Joseph O. Johns and in San Francisco by Assistant U.S. Attorney Stacey Geis.

More information about the case: URL
http://www.epa.gov/enforcement/waste/cases/walmart.html

GE’s Dirty Little Secret

By Marcia Ishii-Eiteman

October 4, 2012

As a scientist at Pesticide Action Network, I am frequently asked these days to explain what genetically engineered (GE) crops have to do with pesticides. When I answer that GE crops both contain and drive up pesticide use, I am often met with earnest incredulity. We seem to need to believe that GE technology is the best thing since sliced bread.

On a radio program just last week, a caller voiced his genuine hopes to me that GE crops would provide a green solution to the woes of the world since he’d heard that these crops increase yield, cure blindness and reduce pesticide use. I was sorry to have to disappoint him on all counts, since GE crops have consistently failed to improve yield, have done nothing to date for Vitamin A deficiency-related blindness and have driven increases in pesticide use since their introduction some sixteen years ago.
Continued from page 17 – GE’s Dirty Little Secret

On this last point, a new study on GE crops out last week added yet more weight to the body of evidence contradicting the GE crop industry’s long-standing myth. Published Friday in the journal *Environmental Sciences Europe*, the Washington State University (WSU) study offers a simple but devastating finding: GE seeds dramatically increase pesticide use, and that use will grow unless we change the course of our food and farming system.

So here it is, the pesticide industry’s dirty little secret: GE seeds are no green solution to the world’s food needs, but are rather the growth engine of the world’s biggest pesticide companies. In point of fact, the latest wave of GE crops is expected to drive a 25-fold increase in the use of one particularly nasty pesticide (2,4-D) in corn over the next seven years.

Analyzing USDA data, the study—authored by WSU research professor Charles Benbrook, a former National Academy of Sciences’ executive director—shows that GE crops have driven up overall pesticide use across the country, with 400 million more pounds applied from 1996 to 2011. Just last year, GE crops used 20 percent more pesticides on average than non-GE crops. The adoption of herbicide-resistant crop technology has been the primary driver, contributing to a 527 million pound increase in herbicide use during the same period. And the increase in pesticide use is expected to continue, if USDA approves the next wave of GE herbicide-resistant crops.

The next cycle of the treadmill is especially frightening. 2,4-D-resistant corn is the first in a new flood of industry products currently under consideration by USDA. If the agency approves it and other 2,4-D crops, use of this hazardous pesticide in corn is expected to surge 25-fold over the next seven years, putting farms, farmers and rural communities in harm’s way. The chemical has been linked to birth defects, neurological damage and cancer, and children are especially susceptible to its effects. For these reasons, 70 medical doctors and health professionals joined Pesticide Action Network this summer in urging EPA to reject Dow AgroScience’s application for new uses of 2,4-D.

What now?

Monsanto, Dow and other major pesticide companies stand to benefit the most from the continued use of glyphosate and surge in 2,4-D and other chemical sales that will accompany the next round of herbicide-based GE crops. So it should come as no surprise to the largest opponents of California’s ‘Right to Know’ ballot initiative to label GE foods are the pesticide companies, together spending nearly $20 million to blanket the airwaves with false and misleading ads about the initiative. I am heartened, however, by recent polls showing Californians resolute in their demand that GE food be labeled.

Of even greater importance, perhaps, is the fact that people are asking serious questions about this technology, and its place in our food and farming systems. Finally we are having a genuine public conversation about genetic engineering, pesticides, our health, our rights and who should control what we eat and how we grow our food: corporations or communities. True, we should have had this conversation sixteen years ago, before the first GE seeds were ushered to market by our public agencies, without adequate safety or efficacy testing. But here and now is still a very good place to start.

Additional resources for editors and reporters:

- Summary of existing research on genetic engineering.
- Additional information on 2,4-D corn and the other genetically engineered crops in the pipeline.
- Major findings and summary of new report from Washington State University [http://www.panna.org/blog/ge-dirty-little-secret](http://www.panna.org/blog/ge-dirty-little-secret)

Warning: Genetically Modified “Agent Orange Corn” Coming soon to a Plate near You

By Carolanne Wright

14 July 2013

Remember Agent Orange, the herbicide sprayed in Vietnam linked with devastating birth defects, cancer and Parkinson’s disease?

Dow AgroSciences would like to feed this toxic chemical to the American population via a new breed of genetically modified corn. If the corporation has its way, “Agent Orange corn” will arrive on dinner plates across the U.S. as early as 2014.

Poisonous history of Agent Orange

Da Thi Kieu experienced the deadly effects of Agent Orange first hand. During the Vietnam War, the U.S. military sprayed her fields with the herbicide. Likewise, her husband was exposed when he fought in the army and died an early death due to cancers associated with the toxin. Of their eight children, seven were born with birth defects and only two survived.

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FEATURED ARTICLES

Glyphosate (Roundup) Carcinogenic In the PARTS PER TRILLION Range

By Sayer Ji
Wake up World, June 24, 2013

An alarming new study finds that glyphosate, the active ingredient in Roundup weedkiller, is estrogenic and drives breast cancer cell proliferation in the parts-per-trillion range. Does this help explain the massive mammary tumors that the only long term animal feeding study on Roundup and GM corn ever performed recently found?

An alarming new study, accepted for publication in the journal Food and Chemical Toxicology last month, indicates that glyphosate, the world’s most widely used herbicide due to its widespread use in genetically engineered agriculture, is capable of driving estrogen receptor mediated breast cancer cell proliferation within the infinitesimal parts per trillion concentration range.[i]

The study, titled, “Glyphosate induces human breast cancer cells growth via estrogen receptors,” compared the effect of glyphosate on hormone-dependent and hormone-independent breast cancer cell lines, finding that glyphosate stimulates hormone-dependent cancer cell lines in what the study authors describe as “low and environmentally relevant concentrations.”

The results were broken down by the researchers as follows:

Glyphosate induces T47D, hormone dependent breast cancer cell growth.

The proliferative effect of glyphosate is mediated via estrogen receptors.

Glyphosate induces ERE [Estrogen Response Element]-transcription activity via estrogen receptors.


These effects indicate that glyphosate is a ‘xenoestrogen,’ capable of inducing Estrogen Response Elements (EREs) in a manner, slightly weaker but functionally similar to the most potent human estrogen Estradiol (E2).

More concerning is the discovery that infinitesimal glyphosate concentrations in the parts-per-trillion range (10 to the minus 12) had proliferative (carcinogenic) effects on the studied T47D breast cancer cells line:

In this study, we found that glyphosate at a log interval concentration ranging from 10-12 to 10-6 M increased the cell proliferation of a hormone dependent breast cancer T47D cell…

The researchers also discovered that the naturally occurring phytoestrogen in soybean known as genistein, produced “an additive estrogenic effect” when combined with glyphosate, raising the serious question as to whether GMO soybeans are contributing to the epidemic levels of breast cancer within countries like the US where they are consumed in relatively high quantities.

It should be noted that the concentrations used to determine the interactive effects of glyphosate and phytoestrogen genistein in this study were modeled “as in a real world situation” by using information obtained from studies that assayed the respective levels of genistein and glyphosate in GM soybeans, as well as human plasma and urine concentrations following their consumption and/or exposure. For instance, glyphosate concentrations have been detected within human urine within the 0.1 – 233 parts per billion range on the lowest end, and an estimated systemic dose of 0.004 mg/kg on the high end.

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Continued from page 19 – Glyphosate (Roundup)
Carcinogenic In the PARTS PER TRILLION Range

The authors stated:

This finding should raise concern about the existence of more than one xenoestrogen such as phytoestrogen and contaminants in plant derived food which may be beneficial or harmful depending on the hormonal and pathological status of consumers. This study implied that the additive effect of glyphosate and genistein in postmenopausal woman may induce cancer cell growth. In this present in vitro study, we showed an estrogenicity of pure glyphosate. In summary, we found that glyphosate exhibited a weaker estrogenic activity than estradiol. Furthermore, this study demonstrated the additive estrogenic effects of glyphosate and genistein which implied that the use of glyphosate-contaminated soybean products as dietary supplements may pose a risk of breast cancer because of their potential additive estrogenicity.” [emphasis added]

This finding is relevant to virtually anyone who consumes genetically modified food today. GM crops, which are designed to survive glyphosate poisoning by being genetically engineered with ‘glyphosate-resistance” (i.e. RoundUp Ready), are universally contaminated with glyphosate and its toxic metabolite AMPA. Furthermore, glyphosate pollution and exposure is now omnipresent, with one 2011 study finding glyphosate in 60-100% of all US air and rain samples tested, and another 2012 study finding that glyphosate widely contaminates groundwater, which is the water located beneath the ground surface, that supplies aquifers, wells and springs. It is therefore virtually impossible to hermetically seal yourself off from the growing global environmental threat by only consuming “certified organic” food. The time has come to face the fact that unless there is a systemic change in the way our GM, petrochemically-driven monocultured food production system operates, we will all experience a great deal of harm.

GM Food/Roundup Breast Cancer Link Already Firmly Established

This latest study is not the only compelling evidence that there is a Roundup-Breast Cancer link. In a previous article titled, “Will the GMO-Breast Cancer Link Be Pinkwashed Away?”, we addressed the disturbing implications of the first long-term GM and Roundup animal feeding study produced by Gilles-Éric Sérinali’s research team last November, and which found that after 90 days (the temporal threshold beneath which all previous biotech industry funded GM food safety studies end) the animals began to show disturbing signs of systemic organ damage, failure and cancer. More pointedly, Sérinali’s team observed that the animals developed massive, estrogen-dependent mammary tumors:

“Suffering inducing euthanasia and deaths corresponded mostly in females to the development of large mammary tumors. These appeared to be clearly related to the various treatments when compared to the control groups. These tumors are generally known to be mostly estrogen-dependent (Harvell et al., 2000). We observed a strikingly marked induction of mammary tumors by R[roundup] alone, a major formulated pesticide, even at the very lowest dose administered. R[roundup] has been shown to disrupt aromatase which synthesizes estrogens (Richard et al., 2005)… [pg. 9]”

Could the results of this latest study help explain the molecular mechanism behind this finding?

Article Sources

http://wakeup-world.com/2013/06/24/glyphosate-roundup-carcinogenic-in-the-parts-per-trillion-range/

Toxic Shock: California allows up to One Thousand Times more Glyphosate in Drinking Water than needed to cause Breast Cancer in Women

By Mike Adams

June 17, 2013

(NaturalNews) Late last week, a story broke that revealed glyphosate -- the chemical name of Roundup herbicide -- multiplies the proliferation of breast cancer cells by 500% to 1300%… even at exposures of just a few parts per trillion (ppt).

The study, published in Food and Chemical Toxicology, is entitled, "Glyphosate induces human breast cancer cells growth via estrogen receptors." You can read the abstract here.

Continued on page 21
Continued from page 20 – Toxic Shock

There's a whole lot more to this story, however, but to follow it, you need to understand these terms:

- ppm = parts per million = 10 (-6) = number of parts out of a million
- ppb = parts per billion = 10 (-9), which is 1,000 times smaller than ppm
- ppt = parts per trillion = 10 (-12), which is 1,000 times smaller than ppb and 1,000,000 times smaller than ppm

The study found that breast cancer cell proliferation is accelerated by glyphosate in extremely low concentrations: ppt to ppb. The greatest effect was observed in the ppb range, including single-digit ppb such as 1 ppb.

This news, all by itself, sent shockwaves across the 'net all weekend. Women were asking things like: "You mean to tell me that glyphosate residues on crops in just ppt or ppb concentrations can give me breast cancer?" It doesn't exactly translate like that. It depends on how much you eat vs. your body mass (nanograms of glyphosate per kilogram of body weight). But with ridiculously small amounts of this chemical now being correlated to cancer cell proliferation, you don't have to eat much at all in order to put yourself at risk.

But it's not just eating glyphosate that's the problem. You're also DRINKING it.

California allows 1,000 ppb of glyphosate in drinking water


The document openly admits:

Glyphosate is a non-selective systemic herbicide used in agriculture, rights-of-way and aquatic systems. Exposure to glyphosate may occur from its normal use due to drift, residues in food crops and from runoff into potential drinking water sources.

It then goes on to state something borrowed straight from Monsanto's quack science team: "Glyphosate is not mutagenic or teratogenic and there is no evidence for reproductive toxicity in multigeneration studies in rats."

Based on this blatant lie, California set an upper limit of "1.0 mg/L (1,000 ppb) for glyphosate in drinking water."

Yes, that's 1,000 times higher than the amount now shown to cause a 500% to 1300% increase in cancer cell proliferation.

What's even more shocking is that California's allowable exposure level was nearly 50% HIGHER than the federal (EPA) level -- 700 ppb.

Yes, California -- the state where more people are concerned about GMOs than seemingly anywhere else -- actually used Monsanto-sounding language in its "official" report that set a higher water contamination level than the federal government!

Glyphosate carcinotoxicity was documented years earlier

Even though California released this document in 1997, the state was already willfully ignoring a growing body of scientific evidence documenting glyphosate toxicity. For example, a study published two years earlier -- in 1995 -- in the Journal of Pesticide Reform (Volume 15, Number 3, Fall 1995) written by Caroline Cox concluded:

Glyphosate-containing products are acutely toxic to animals, including humans...In animal studies, feeding of glyphosate for three months caused reduced weight gain, diarrhea, and salivary gland lesions. Lifetime feeding of glyphosate caused excess growth and death of liver cells, cataracts and lens degeneration, and increases in the frequency of thyroid, pancreas, and liver tumors.

Glyphosate-containing products have caused genetic damage in human blood cells... reduced sperm counts in male rats... an increase in fetal loss...

In other words, California knew -- or should have known -- that glyphosate was harmful to humans. But the California government willfully ignored this evidence and seemingly went out of its way to incorporate deceptive Monsanto spin into its "Public Health Goal" documents, thereby allowing 1,000 times higher levels of glyphosate in drinking water than we now know to cause cancer cell proliferation.

Ten years later, California lowers its level by just 10%

Fast forward to 2007. After a public comment period which was no doubt dominated by disinfo-spewing Monsanto trolls, the state of California issued an updated Public Health Goal (PHG) document.

You can view that document here: http://oehha.ca.gov/water/phg/pdf/080406dglyphosate.pdf

It concludes that the allowable glyphosate exposure for all Californians should be lowered to 900 ppb -- still nine hundred times higher than the amount needed to accelerate cancer cell growth as we see in the study released last week.

This 2007 document from the California government also borrows language that sounds like it's right out of Monsanto's P.R. department: "Based on the genotoxicity..."

Continued on page 22
Continued from page 20 – Toxic Shock

and carcinogenicity study results, glyphosate is not likely to pose a cancer hazard to humans,” it says.

Now the evidence is becoming clear: Monsanto's chemicals are killing women

Now it's 2013. We've seen the horrific results of the GMO rat study revealing the growth of massive tumors in rats exposed to GMOs and Roundup (glyphosate). We've also now seen the "parts per trillion" study showing cancer cell proliferation being caused by ultra-low concentrations of glyphosate.

We also know the biotech industry has gone to ridiculous lengths to spread disinfo on all this -- to try to discredit scientists who speak out against GMOs and glyphosate, to get scientists blackballed from the industry, and to buy off politicians and members of the press to make sure there is no coverage granted to any scientific studies reporting the dangers of genetically modified crops (and their related chemical herbicides).

**Glyphosate is the new DDT**

Based on what we're seeing now, I believe glyphosate is the most toxic chemical that has ever been widely deployed across our food supply. Glyphosate is the new DDT, and it's contaminating our waterways, soils, food and bodies.

Furthermore, the California government has clearly been complicit in allowing extremely high levels of glyphosate to contaminate the public drink water, thereby causing tens of millions of Californians to be poisoned with concentrations of glyphosate that promote cancer cell growth.

And what will the California government tell you now that the truth has come out? Now that they've allowed their own population to be exposed to a thousand times the concentration needed to accelerate the growth of cancer tumors?

"Run for the cure!" And don't label GMOs, either, because you don't have a right to know whether you're eating deadly poison in your food.

**Join the Monsanto Video Revolt, July 24, 2013**

Take part in the global video revolt against Monsanto. Learn more at:

[www.MonsantoVideoRevolt.com](http://www.MonsantoVideoRevolt.com)

http://www.naturalnews.com/040808_glyphosate_breast_cancer_drinking_water.html

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**Is Monsanto's Herbicide Harming Male Fertility?**

By Sayer Ji

May 19, 2012

In a disturbing new study published last month (Dec. 2011) in the Journal of Toxicology in Vitro, researchers found that Monsanto's popular "weed killer" known as Roundup, which has already been linked to over 25 adverse health effects, is also capable of interfering with and/or harming the male reproductive system.

Researchers tested Roundup, a glyphosate-based herbicide, on mature rat testicular cells at a concentration range between 1 and 10,000 ppm, which they described as "the range in some human urine and in environment to agricultural levels." They found that within 1 to 48 hours of Roundup exposure testicular (Leydig) cells were damaged or killed.

What is more disturbing is that even at a lower, presumably "non toxic" concentration of 1 ppm of Roundup, or glyphosate by itself, testosterone concentrations were observed to decrease by 35%.

Keep in mind that 1 ppm of Roundup is an infinitesimal.
and testicular, underscoring Male Fertility?

Continued from page 22 - Is Monsanto's Herbicide Harming Male Fertility?

Heavy use of the world’s most popular herbicide, Roundup, may be linked to a range of health problems and diseases, including Parkinson’s, infertility and cancers, according to a new study.

The report, published this month in the online journal Entropy, said evidence indicates that residues of glyphosate, the chief ingredient in Roundup and other weedkillers, has been found in food.

Those residues enhance the damaging effects of other food-borne chemical residues and toxins in the environment to disrupt normal body functions and induce disease, according to the report, authored by Stephanie Seneff, a research scientist at the Massachusetts Institute of Technology, and Anthony Samsel, a retired science consultant from the management consulting firm Arthur D. Little and a member of the Union of Concerned Scientists, an advocacy group.

“Negative impact on the body is insidious and manifests slowly over time as inflammation damages cellular systems throughout the body,” the study says.

We “have hit upon something very important that needs to be taken seriously and further investigated,” Seneff said.

Environmentalists, consumer groups and plant scientists from several countries have warned that heavy use of glyphosate is causing problems for plants, people and animals.

The EPA is conducting a standard registration review of glyphosate and has set a deadline of 2015 for determining if its use should be limited. The study is among many comments submitted to the agency.

Monsanto is the developer of both Roundup herbicide and of crops that are genetically altered to withstand being sprayed with the weedkiller.

These biotech crops, including corn, soybeans, canola and sugarbeets, are planted on millions of acres in the United States annually. Farmers like them because they can spray Roundup directly on the crops to kill weeds in the fields without harming the crops.

Roundup is tied to Infertility and Cancer; Herbicide’s Maker calls it Safe

By Carey Gillam

April 29, 2013

There are already 16 studies in the biomedical literature indicating that glyphosate acts an an endocrine disruptor, with a 2010 paper revealing that prepubertal exposure to commercial formulation of the herbicide glyphosate alters testosterone levels and testicular morphology. Also, cell research from 2009 indicates that concentrations of glyphosate as low as 500 parts per billion may disrupt endocrine function, underscoring just serious the problem of low-dose exposure really is.

Ultimately, the connection between Roundup/glyphosate and endocrine disruption is not simply theoretical. Most of us in the industrialized world are already being exposed to significant concentrations in our air, rain, drinking water and food. Mass herbicide exposure is just one form of fall-out from what is perhaps the largest example of mass human experimentation ever conducted: the global co-option of the world's food supply (and modes of food production) by chemical and biotech companies. We did not give our consent to this experiment, nor were we fully informed -- glaring evidence that our human rights were violated.

Only through raising awareness will we be able to turn the tide against the ceaseless chemical and biological assault against our health articulated through companies like Monsanto and Dow AgroScience

http://www.greenmedinfo.com/blog/monsantos-herbicide-harming-male-fertility

Blackherbals at the Source of the Nile UG LTD.

Continued on page 24
Roundup is also used on lawns, gardens and golf courses.

Monsanto and other leading industry experts have said for years that glyphosate is proven safe and has a less damaging impact on the environment than other commonly used chemicals.

Jerry Steiner, Monsanto’s executive vice president of sustainability, reiterated that when questioned about the new study.

“We are very confident in the long track record that glyphosate has. It has been very, very extensively studied,” he said.

Of the more than two dozen top herbicides on the market, glyphosate is the most popular. In 2007, as much as 185 million pounds of glyphosate were used by U.S. farmers, twice the amount used six years ago, according to Environmental Protection Agency data.

http://articles.washingtonpost.com/2013-04-29/national/38895115_1_glyphosate-roundup-herbicide-

Weed Killer Glyphosate Found in Human Urine across Europe

By Anne Sewell

June 18, 2013
Digital Journal

Friends of the Earth Europe (FoE) commissioned a series of urine tests on people in 18 countries across Europe. The results were released on Thursday and FoE is asking, “Why is there weed killer in our bodies?”

The findings from these tests raise serious concerns about the increasing levels of exposure to glyphosate-based weed killers, which are commonly used by farmers, public authorities and gardeners across Europe. What is worrying is that should more genetically modified (GM) crops be grown in Europe, the use of glyphosate is predicted to rise even further. According to FoE, despite the widespread use of the weed killer, there is little monitoring of glyphosate at present in food, water or the wider environment.

The FoE test is the first of its kind in Europe to test for the presence of the weed killer in human bodies. Spokesperson for Friends of the Earth Europe, Adrian Bebb said on their website: “Most people will be worried to discover they may have weed killer in their bodies. We tested people living in cities in 18 countries and found traces in every country. These results suggest we are being exposed to glyphosate in our everyday lives, yet we don’t know where it is coming from, how widespread it is in the environment, or what it is doing to our health.

“Our testing highlights a serious lack of action by public authorities across Europe and indicates that this weed killer is being widely overused. Governments need to step-up their monitoring and bring in urgent measures to reduce its use. This includes rejecting any genetically modified crops that would increase the use of glyphosate.”

The group is calling on the EU to urgently investigate how glyphosate is finding its way into people’s bodies. They are demanding that there is an increase in the levels of monitoring in the environment, food and water. They also demand immediate restrictions on the use of glyphosate across Europe.

The laboratory tests were run between March and May 2013 on urine samples from volunteers in 18 countries across the European Union. On average, 44% of the samples contained glyphosate. The proportion of glyphosate found in the samples varied between countries, with Malta, Germany, the UK and Poland having the most positive tests, and lower levels detected in Macedonia and Switzerland.

The volunteers who were tested and provided samples all live in cities. None of them had handled or used glyphosate products in the run-up to the tests. Monsanto is the largest producer of glyphosate, and the corporation sells it under the brand name “Roundup.”

The product is used on many genetically modified crops. At present, there are 14 new GM crops, designed for cultivation with glyphosate, awaiting approval to be grown in Europe. Should these additional crops be approved, this would inevitably lead to a further increase of glyphosate spraying in the EU.

The product is used on many genetically modified crops.
At present, there are 14 new GM crops, designed for cultivation with glyphosate, awaiting approval to be grown in Europe. Should these additional crops be approved, this would inevitably lead to a further increase of glyphosate spraying in the EU.

The full results of ‘Determination of Glyphosate residues in human urine samples from 18 European countries’ by Medical Laboratory Bremen are available online.

More detail of the samples used: Urine samples were collected from volunteers in Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, France, Georgia, Germany, Hungary, Latvia, Macedonia, Malta, Poland, Spain, Switzerland, The Netherlands, and the UK. A total of 80/182 samples tested were found to contain glyphosate. Volunteers were all city-dwellers and included vegetarian and non-vegetarian diets. No two samples were tested from the same household. The samples were analysed by Dr Hoppe at Medical Laboratory Bremen in Germany.”

However, according to Farmers Weekly magazine, UK scientists who reviewed the study said its findings were “unreliable.” The magazine quoted Alison Haughton, head of the pollination ecology group at Rothamsted Research, as saying: “This is not good science – I cannot find where the methodology and results are published [note they are published here], and so it is impossible to assess the robustness of the work.”

“If FoE and GM Freeze want their work to have scientific credibility, and provide a genuine contribution to the debate on pesticide residues, then they should submit their work for publication in a peer-reviewed journal.”

“As it stands, this press release is completely insubstantial, it is not scientific, and cannot be taken seriously by anyone.”

And apparently Monsanto insists that glyphosate “does not pose any unacceptable risk to human health or the environment”. “It is not surprising to find glyphosate in urine should a person ingest food with low residues of glyphosate. Glyphosate is not metabolized by the human body but excreted into the urine and faeces. This is a well-known aspect of glyphosate that contributes to its comprehensive safety assessment,” Monsanto’s spokesperson told the magazine. “We always take any allegation seriously and would like to know more,” he added.

Continued from page 25 - GM MAIZE’S HEALTH EFFECTS

and placental cell lines, and on human placental extracts, primary umbilical cord cells and freshly isolated testicular cells. Glyphosate, the active ingredient of Roundup, had also been found to cause endocrine disruption in human cells at sub-agricultural doses.

Previous research had also found that adjuvants added to the herbicide formulations are not inert, but rather can be the active route for toxicity.

Meanwhile, a re-analysis of the raw data of a 90-day feeding trial with rats fed Roundup tolerant NK603 had previously showed signs of toxic effects on liver and kidney.

Therefore, this latest research studied the effects of the full commercial formulation of Roundup, as well as of the genetically engineered maize, on its own as well as sprayed with Roundup.

The results, as presented at the conference, showed that rats fed with the genetically engineered maize and/or Roundup died more rapidly. The first male fed the genetically engineered maize to die did so one year before the first control, while the first female, eight months before the first control. Significantly, mortality was higher in the treated groups, for example, there was two to three times more mortality in all treated female groups.

According to the researchers, tumours also developed more rapidly in rats fed the genetically engineered maize and/or Roundup; up to 600 days before the controls in males, which saw tumours develop in the skin and kidneys, and on average 94 days before the controls in females, largely in the mammary glands.

There were two to three times more tumours in treated rats for both sexes.

All in all, the study found that female rats died mostly from mammary tumours and pituitary dysfunctions, while males died mostly from pathologies in the liver and kidneys. The pathological profiles were similar for the three treatments.

The researchers hypothesized that the reason why NK603 maize, NK603 maize sprayed with Roundup, and Roundup on its own, all produced very similar impacts, is that both the genetically engineered maize and Roundup may cause hormonal disturbances in the same biochemical and physiological pathway.

The researchers recommended that the authorizations of these products need to be reconsidered. This is perfectly consistent with the Cartagena Protocol on Biosafety, which in its Article 12 preserves the right of Parties of import to, at any time, in light of new scientific information, review and change their decision regarding an LMO import. Many national biosafety laws also contain such safeguards to enable the authorities to take into account new information on potential adverse impacts, not only on biological diversity, but also on human health.

Furthermore, the scientists recommended that the existing risk assessment protocols should be revised in light of the findings. Specifically, the 90-day tests with rats, which are currently done by the industry and presented to regulators, need to be extended to two years for all LMOs, and pesticides need to be tested for two years at low levels and with their full commercial formulations.

As Parties to the Cartagena Protocol gather for their sixth meeting in Hyderabad, these new results should inform their discussions, in line with the precautionary principle, particularly on risk assessment and risk management, and including on the identification of LMOs or specific traits of LMOs that may adverse effects on the conservation and sustainable use of biological diversity, taking into account risks to human health. – Third World Network Features.

About the writer: Lim Li Ching is a Researcher with Third World Network.

http://www.twnside.org.sg/twnf/2012/3869.htm

Continued from page 18 – Warning: Genetically Modified “Agent Orange Corn” Coming soon to a Plate near You

Sadly, Kieu’s story is not an unfamiliar one. Countless others throughout Vietnam and America have suffered at the hands of Agent Orange. Parkinson’s, Hodgkin’s disease, Bcell leukemias and multiple myeloma are all linked with exposure to the herbicide. And the poisons don’t just magically disappear — decades later, traces are still found in the soil. Additionally, many view Agent Orange as chemical warfare. According to Global Research:

“...In US Senate Congressional Records dated August 11, 1969, a table presented to senators showed that congress clearly classified 2,4-D and 2,4,5-T (main components of Agent Orange) in the Chemical and Biological Warfare category."

If Agent Orange is so toxic, why does Dow AgroSciences want to introduce more of it into our food supply?

Continued on page 27

26– Traditional African Clinic July 2013
Follow the money
As with all genetically modified crops, the reason comes down to one point: corporate profit. It is not about feeding the hungry masses or improving the lives of millions. The main motivating force is always money, plain and simple. This is why whenever a new GM crop is on the ticket for approval, food activist groups like the Organic Consumers Association go on high alert. They realize mega corporations such as Monsanto and Dow are up to something — and it’s most likely harmful.

New “Frankencorn” crop
Enlist brand GM corn is Dow AgroSciences latest mutant baby. It’s a crop developed to withstand extreme amounts of 2,4-D — an ingredient found in Agent Orange that severely jeopardizes the health of the environment as well as that of humans and wildlife. Round Up Ready resistant ‘superweeds’ apparently need something stronger. Enter Agent Orange.

As accurately observed by conventional soybean and corn farmer George Naylor, “Farmers are on the front lines of this potential chemical disaster,” and adds, “I’m also very concerned about the further pollution of the air and water in my community.” Scientists and more than 140 advocacy groups have flooded U.S. Agriculture Secretary Tom Vilsack’s inbox with letters protesting Dow’s regulatory application for the Enlist crop. But further pressure is needed to stop the approval. To take action against this toxic new breed of corn, click here.

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Herbicide and Pesticide Exposure linked to Parkinson's Disease

By Case Adams

June 05, 2013

A recent study from UCLA has confirmed that exposure to the herbicide Paraquat is linked with a heightened risk of Parkinson's disease. This combines with other research that has found other chemicals used on our foods and landscapes significantly increase the risk of Parkinson's.

The researchers, from UCLA’s Fielding School of Public Health, studied 357 Parkinson’s disease cases along with 754 control subjects - adults from Central California. The researchers determined increased exposure to the herbicide Paraquat through geographic mapping linking their home locations to agricultural use of the chemical on farms. Those living closer to farms that sprayed the herbicide were found to have a along with 754 control subjects - adults from Central California. The researchers determined increased exposure to the herbicide Paraquat through geographic mapping linking their home locations to agricultural use of the chemical on farms. Those living closer to farms that sprayed the herbicide were found to have a 36% increased risk of Parkinson’s.
Continued from page 27 – Herbicide and Pesticide Exposure linked to Parkinson's Disease

However, those who experienced a head injury combined with increased Paraquat exposure tripled their chances of having Parkinson's disease.

Researchers from Mexico's Unidad de Medicina Familiar also studied cases of Parkinson's together with exposure to the herbicide Paraquat among Mexican workers. They also found a positive association between exposure to this chemical and Parkinson's disease.

Paraquat is N,N'-dimethyl-4,4'-bipyridinium dichloride.

A study published last year from the Louvain Center for Toxicology and Applied Pharmacology of Brussels' Catholic University of Louvain concluded that pesticide exposure was also significantly linked to Parkinson's. Here the researchers analyzed and calculated the data from twelve peer-reviewed clinical studies that investigated Parkinson's disease together with pesticide exposure. They collected research conducted between 1985 and 2011.

The meta-analysis found that all twelve studies individually and collectively established a link between pesticide exposure and Parkinson's disease.

After calculating meta-data ratios and relative risk, the researchers found that Parkinson's disease incidence as diagnosed by a neurologist was more than two-and-a-half times for those exposed to more pesticides compared to those less exposed. Other risk calculations showed the increased incidence of Parkinson's disease to range from nearly double to 28% - which was the average of all cases studied.

But when the research focused upon farm workers involved in the growing of bananas, pineapples or sugarcane, the incidence of Parkinson's disease more than doubled that of lower-exposure individuals.

The researchers concluded:

The present study provides some support for the hypothesis that occupational exposure to pesticides increases the risk of Parkinson's disease.

Since this review study came out, other studies have investigated some of the worst pesticides, and the mechanisms by which they produce Parkinson's disease.

A study from Korea's Yonsei University studied the broad spectrum pesticide Rotenone – and how it damages nerve cells and pathways. The researchers found that Rotenone induces cell death in a process called G2/M cell cycle arrest. G2/M cell cycle arrest blocks the process of mitosis that enables cells and their DNA to replicate – and more importantly among nerve cells - repair any DNA damage.

Thus the insecticide basically blocks the ability of the nerve cell to repair itself – leading to the cells eventually dying off or mutating.

Meanwhile, researchers from UCLA's David Geffen School of Medicine found that the fungicide Benomyl will block multiple cell processes. One of these blocks the production of aldehyde dehydrogenase (ALDH). This increases the dopamine metabolite 3,4-dihydroxyphenyl-acetaldehyde, which produces among neurons associated with degeneration the production of dopamine. One of the central dopamine-producing centers exists in the brain – the substantia nigra located within the midbrain.

A lack of these neurotransmitters will produce the shakiness and eventual loss of coordination characteristic amongst progressed Parkinson's patients.

When the nerve cells located in this region die off or become otherwise deranged, they stop producing Is eating non-organic food worth risking the health of not only our children and family? Is it worth risking the health of farm workers who are exposed to these toxic chemicals every day? And what about spraying pesticides and herbicides around the house?

http://thewatchers.adorraeli.com/2013/06/05/herbicide-and-pesticide-exposure-linked-to-parkinson-s-disease/

Allergy and Pesticides

Ten Questions and Answers

HOW IS ALLERGY DEFINED?
Allergy may be defined as a hypersensitivity reaction in a person to an exposure that does not affect most people. About five percent of the population has a genetic tendency to develop allergies. This condition, called atopy, runs in families, starting in infancy with skin problems (eczema), wheezing, food intolerance and other susceptibilities. The most common allergens are proteins which occur in nature. The term "allergy" has become so popular that a recent survey revealed that 37% of those interviewed thought that they were "allergic" to something. However, clinical allergy is diagnosed by a combination of history, physical examination, and special tests.

HOW IS ASTHMA DEFINED?
Respiratory allergy is one kind of hypersensitivity. It is manifest in two forms: "intrinsic" and "extrinsic." Intrinsic asthma is a physiological (not environmental) condition which occurs in certain people. They have a lifelong condition of airway response (called reactive...
Continued from page 28 - Allergy and Pesticides

airway; infections, allergens, and irritants (including chemicals) trigger excessive spasm and swelling of the bronchi. Once recognized, reactive airway patients can be helped with a lifelong medical program and strict avoidance of specific triggering substances. Extrinsic asthma refers to a respiratory reaction to specific allergens in the environment. Environmental allergens may include manmade substances such as chemicals and natural substances such as airborne mold from peanuts or cheese. There are allergic reactions to microbes, dander, insect venoms, house dust, and plant products such as pollens, wood dust, thorns and sap. Allergic responses to prescribed drugs are well known. Many causes of extrinsic asthma can be diagnosed with skin tests and can be corrected or modified by a series of shots called desensitization.

WHAT ABOUT ALLERGY OF THE SKIN?
There are at least five major types of skin reactions. The most common is an irritant reaction from a sharp prick or scratch. This will cause an immediate flare of the skin especially in certain atopic individuals. The next type is a reaction to a foreign protein which produces a hive or welt which itches. This occurs within 30 minutes through a substance carried in the blood called IgE (immunoglobulin). The third response is delayed hypersensitivity which is characterized by a response of the lymphocytes or white blood cells. This response takes a minimum of 24 to 36 hours to respond to the allergic challenge of the sensitizing substance. The fourth type of response is similar to the third type but requires addition of ultraviolet light and is called photosensitivity. For example, oral tetracycline antibiotic can cause a delayed type of rash in people when they are exposed to sunlight. It is more severe and long lasting than simple sunburn. The fifth type of skin reaction is poorly understood. This is a psychosomatic skin reaction that occurs when a person, under unusual stress, breaks out in hives.

HOW ARE PEOPLE EXPOSED TO PESTICIDES WHICH MIGHT RESULT IN ALLERGIC SYMPTOMS?
Pesticides may be encountered as residues in food, air and water. People may also be exposed to pesticides used in agriculture, applications for pest control at home or at work, applications to roadside right-of-ways to control weeds and applications of pesticides for public health vector control programs. A specific pesticide exposure which might cause an allergic reaction in a susceptible individual can be 1,000 times less than an exposure which would cause a toxic reaction. For example, exposure to pyrethrum can trigger an asthma attack at a trivial dose of exposure.

WHY DO SOME PEOPLE COUGH, WHEEZE OR SNEEZE WHEN THEY ARE AROUND PESTICIDE SPRAYS?
The answer is not simple. Pesticide products consist of two components: the active ingredients whose percentage is very small and the inert ingredients which account for the bulk of most products. The active ingredient is usually a single, highly purified component although it may be a combination of two or more pesticides. Usually, the inert ingredients consist of carriers such as petroleum distillates, but may contain other chemicals such as emulsifiers, conditioning agents or wetting agents. Their ability to irritate or sensitize is poorly understood. Some pesticides react to the strong odor and irritating effect of petroleum distillates. The eyes, the mucous membranes of the nose and even the sensitive linings of the mouth and the back of the throat may feel scratchy. This is usually an annoying symptom which subsides within a few minutes after being removed from exposure to the irritant. Irritation occurs not only with manmade volatile substances, but also with naturally occurring substances such as perfumes, flowers, or onions. A pesticide product which causes someone to develop severe, acute respiratory symptoms would be a true hypersensitivity to one of the active ingredients. This can occur with a limited number of specific pesticides, all requiring clinical confirmation.

Allergic symptoms tend to last for hours or days; irritant symptoms clear up quickly when the person moves away from the source of exposure. There is no specific desensitization for pesticide allergy.

HOW COMMON IS ALLERGY TO PESTICIDES?
Fortunately, few of the thousands of pesticides used today cause true allergic symptoms. Like cosmetics, pesticides are tested for their allergenic potential prior to marketing. Which pesticide is responsible for the asthma attack or the rash requires detective work by the patient and the doctor.

WHICH PESTICIDES CAUSE ALLERGY?
The following list of common names of pesticides has been reported by scientists to be sensizers in certain susceptible individuals: alidochlor, anilazine, antu, barban, benomyl, captan, captan, dazomet, dichloropropane, dichlorpropene, lindane, maneb, nitrofen, propachlor, pyrethrum/pyrethroids, rotenone, thiram, zineb.

DO PESTICIDE LABELS CARRY ALLERGY WARNINGS?
Pesticide labels carry warnings about known health effects. Most of these deal with toxicity. Some indicate problems that have been reported with either irritation to
the skin, eyes, and respiratory tract or true hypersensitivity reactions. It is important to read the label carefully before using the pesticide. Protective clothing is effective for irritants, but may not protect against an allergen. Strict avoidance is recommended by the allergist.

WHAT SHOULD A PERSON DO WHO SUSPECTS PESTICIDE ALLERGY?
Persons who suspect allergy should take the pesticide label to their physician to begin the investigation. Expert consultation is available to the physician from a variety of experts in allergy and other sources. Interestingly, after years of tolerating a substance without symptoms, a person may "become" allergic to it. There is no explanation for this, doctors have learned to expect such cases of changes in immune reactions.

HOW WILL A DOCTOR HELP ME?
Specific diagnosis is the key to any puzzling case of disease. An alert physician and a conscientious patient can work out the most likely diagnosis.

They do this by keeping an accurate history of the time, place and activity at the onset of symptoms. This then leads to selective clinical tests for specific agents. Consultation and support of an allergy specialist may be required.

SUMMARY
Remember, some use the terms "allergy" and "sensitivity" incorrectly. True symptoms of allergy are not the same as irritant effects: diagnosis and treatment are different. Simple avoidance of suspect allergens and use of antihistamines help most people counter allergic reactions. Others may need to carry an adrenaline syringe to prevent anaphylactic shock from food, insect stings, etc. Inhaled medications relieve reactive airway symptoms.

http://academicdepartments.musc.edu/family_medicine/oem_a_gmed/Allergypesticides.htm

Scientists Discover What’s Killing the Bees and It’s Worse than You Thought

25 July 2013

The mysterious mass die-off of honey bees that pollinate $30 billion worth of crops in the US has so decimated America’s apis mellifera population that one bad winter could leave fields fallow.

Now, a new study has pinpointed some of the probable causes of bee deaths and the rather scary results show that averting beemageddon will be much more difficult than previously thought.

Scientists had struggled to find the trigger for so-called Colony Collapse Disorder (CCD) that has wiped out an estimated 10 million beehives, worth $2 billion, over the past six years.

Suspects have included pesticides, disease-bearing parasites and poor nutrition. But in a first-of-its-kind study published today in the journal PLOS ONE, scientists at the University of Maryland and the US Department of Agriculture have indentified a witch’s brew of pesticides and fungicides contaminating pollen that bees collect to feed their hives.

The findings break new ground on why large numbers of bees are dying though they do not identify the specific cause of CCD, where an entire beehive dies at once.

When researchers collected pollen from hives on the east coast pollinating cranberry, watermelon and other crops and fed it to healthy bees, those bees showed a significant decline in their ability to resist infection by a parasite called Nosema ceranae.

The parasite has been implicated in Colony Collapse Disorder though scientists took pains to point out that their findings do not directly link the pesticides to CCD.

The pollen was contaminated on average with nine different pesticides and fungicides though scientists discovered 21 agricultural chemicals in one sample.

Scientists identified eight ag chemicals associated with increased risk of infection by the parasite. Most disturbing, bees that ate pollen contaminated with fungicides were three times as likely to be infected by the parasite. Widely used, fungicides had been thought to be harmless for bees as they’re designed to kill fungus, not insects, on crops like apples.
"There’s growing evidence that fungicides may be affecting the bees on their own and I think what it highlights is a need to reassess how we label these agricultural chemicals," Dennis vanEngelsdorp, the study’s lead author, told Quartz.

Labels on pesticides warn farmers not to spray when pollinating bees are in the vicinity but such precautions have not applied to fungicides.

Bee populations are so low in the US that it now takes 60% of the country’s surviving colonies just to pollinate one California crop, almonds. And that’s not just a west coast problem—California supplies 80% of the world’s almonds, a market worth $4 billion.

In recent years, a class of chemicals called neonicotinoids has been linked to bee deaths and in April regulators banned the use of the pesticide for two years in Europe where bee populations have also plummeted. But vanEngelsdorp, an assistant research scientist at the University of Maryland, says the new study shows that the interaction of multiple pesticides is affecting bee health.

"The pesticide issue in itself is much more complex than we have led to be believed," he says.

"It’s a lot more complicated than just one product, which means of course the solution does not lie in just banning one class of product."

The study found another complication in efforts to save the bees: US honey bees, which are descendants of European bees, do not bring home pollen from native North American crops but collect bee chow from nearby weeds and wildflowers.

That pollen, however, was also contaminated with pesticides even though those plants were not the target of spraying.

"It’s not clear whether the pesticides are drifting over to those plants but we need take a new look at agricultural spraying practices," says vanEngelsdorp.


Soy-Based Lunch kills 22 Children in India: Have GMOs and Pesticides become Instant Killers?

By RiseEarth.com

July 21, 2013

At least 22 children in India have died as a result of eating soy-based school lunches served to them in the country’s Bihar state, according to new reports. The tainted lunches, which were loaded with genetically-modified (GM) soybeans and pesticide chemical residues, were given to the student victims as part of a U.K.-based government meal program similar to the one currently being implemented in the U.S. by Michelle Obama for American public schoolchildren.

The U.K.’s Independent reports that the culprit meals contained a blend of rice, soybeans and potatoes, and had apparently been doused with an unidentified new cooking oil that was later determined to be tainted with toxic crop insecticides. Early on, the school's cook warned her superiors that the new oil appeared "discolored and dodgy," but her concerns were ignored when school officials insisted that the oil was safe.

Not long after students ate the first meal served with the new oil, dozens of them began to vomit profusely and some developed severe diarrhea. Several of them had to be immediately rushed to the hospital for emergency care, which sent the school's headmaster running for the hills -- according to reports; she literally fled the school after first learning that students were becoming ill from eating the food.

"We feel that some kind of insecticide was either accidentally or intentionally mixed in the food, but that will be clear through investigations," said R.K. Singh, the medical superintendent at the local children's hospital in Patna, Bihar's capital. "We prepared antidotes and treated the children for organic phosphorus poisoning," he added, noting that early tests identified the presence of a toxic organophosphate chemical in the tainted food.

But the school itself appears to have dropped the ball in helping its sick children in the immediate aftermath of the poisoning. Reports indicate that it took about 15 hours after the first child fell ill to evacuate the rest. It was only after 17 children died that school officials began to take the situation seriously by trying to actually help the children.

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SAN SALVADOR, El Salvador — Bringing new urgency to a mysterious kidney disease afflicting the region’s agricultural laborers, Central America’s health ministries signed a declaration Friday citing the ailment as a top public health priority and committing to a series of steps to combat its reach.

Over the last two years, the Center for Public Integrity has examined how a rare type of chronic kidney disease (CKD) is killing thousands of agricultural workers along Central America’s Pacific Coast, as well as in Sri Lanka and India. Scientists have yet to definitively uncover the cause of the malady, although emerging evidence points to toxic heavy metals contained in pesticides as a potential culprit.

Following years of official inaction in the U.S. and beyond, Friday’s San Salvador declaration — for the first time — formally recognized the disease and its unique characteristics.

“This disease fundamentally affects socially vulnerable groups of agricultural communities along the Pacific Coast of Central America, predominates among young men, and has been associated with conditions including toxic environmental and occupational risk factors, dehydration, and habits that are damaging to renal health,” said the declaration adopted by the Council of Health Ministers of Central America.

The ministers pledged potentially meaningful new steps, including more detailed statistical tracking of CKD, the development of national and regional plans to investigate and treat the disease, and promotion of stronger regulation of agrochemicals.

The declaration represented a major victory for El Salvador and its health minister, Dr. Maria Isabel Rodriguez. Ninety years old and barely five feet tall, peering from behind enormous eyeglasses, Rodriguez has been a driving force behind catapulting the ailment from obscurity to formal recognition as a leading regional threat.

“This is a disease of poor people,” Rodriguez said. “This is a disease of people who work in the fields and have very bad living conditions.”

The outcome signaled a turnaround by the U.S. Centers for Disease Control and Prevention, which in 2011 helped beat back an effort by El Salvador to declare the malady a top priority for the Americas. The CDC now says it has devoted “several hundred thousand” dollars to support research of the disease, created a multidisciplinary internal task force on chronic kidney disease in Central America, and pledged to help fund a national survey by El Salvador to measure the prevalence of chronic ailments including CKD.

“We have that commitment to provide the support to follow and strengthen their investigations in the ministries of health,” said Dr. Nelson Arboleda, the CDC’s director for Central American Region.

The San Salvador conference also marked a threshold in international cooperation in combating the mysterious disease. Following years in which researchers battling parallel epidemics in Central America, Sri Lanka and India failed to compare results, Sri Lanka sent an official delegation to El Salvador and urged Central America to consider its research findings and policy responses as a model for future action.

“We are having enough clinical, biochemical and histopathological evidence to say this is the same disease,” said Channa Jayasumana, Sri Lanka’s delegate in El Salvador.

The disease has felled thousands. In Sri Lanka, more

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Continued from page 32 – New Urgency Targets Mysterious Kidney Disease in Central America

than 8,000 patients are receiving treatment for CKD of unknown cause, an official report found, a figure representing just a fraction of those affected by a disease that remains latent until its advanced stages.

More than 16,000 men died of kidney failure in Central America from 2005 to 2009, with annual deaths increasing more than threefold since 1990, according to an analysis of World Health Organization data. In El Salvador, CKD has become the leading cause of hospital deaths among adult men.

The Debate over Pesticides
Although the declaration reflected broad agreement to take action, the two-day conference that preceded its signing was dominated by a forceful debate. The central question: whether there was adequate evidence to declare the disease is linked to agrochemicals and respond by restricting their use.

At the conference, El Salvador presented findings from an ongoing official study, conducted jointly with the Pan American Health Organization, suggesting that pesticides and fertilizers containing heavy metals may be to blame. Environmental tests of soil and water samples in a village heavily affected by CKD, Ciudad Romero, found the presence of high levels of cadmium and arsenic, heavy metals toxic to the kidneys. Among a sample of 42 residents of Ciudad Romero who suffer from CKD, all reported applying pesticides without any protective equipment.

A national sample of 46 CKD patients found that 96% reported using pesticides, and medical tests of these patients revealed additional symptoms such as impaired reflexes and damage to arteries in the lower limbs that suggest toxic poisoning.

El Salvador’s findings echo those in Sri Lanka. An official study there, conducted by the Sri Lankan health ministry in partnership with the World Health Organization, documented elevated levels of cadmium and arsenic contained in agrochemicals and within environmental samples from the endemic region — and found the same heavy metals in samples of urine, hair and nails of patients. Sri Lanka also found residues of several pesticides in the urine of many of the affected patients.

Since publication of its report, the Sri Lankan government has imposed a ban on four common pesticides from use in the endemic region. Rodriguez, El Salvador’s health minister, said she also hopes to ban pesticides that are potentially linked to the epidemic.

Yet other researchers questioned the weight of evidence pointing to pesticides. El Salvador found arsenic above permitted levels in one location in Ciudad Romero and cadmium above permitted levels in another location in the same village — hardly proof of widespread contamination, critics say. The nation also has yet to complete toxicology tests that will determine whether the heavy metals came from pesticides, or whether heavy metals and pesticide residues appeared in blood, urine, or tissue samples of CKD patients.

Basic questions about the pesticide hypothesis remain unanswered in both El Salvador and Sri Lanka’s reports, including evidence of how the agrochemicals are entering victims’ bodies or what products are at fault. Despite the dramatic parallel findings from the recently released reports, no peer-reviewed studies in more than a decade of research have established a definitive link to agrochemicals.

“There is still no direct causal connection,” said Dr. Ramon Trabanino, a Salvadorean nephrologist who published two of the first studies demonstrating the presence of the disease. “I think all of this is political. They want something to blame.”

The controversy came to head in the final portion of the scientific conference. The argument pitted skeptics of the evidence against conference organizers who argued that the Sri Lankan and Salvadorean results were clear enough to create a moral obligation to take precautionary action. The debate was concluded by Rodriguez, who delivered a forceful defense of El Salvador’s findings. “What has been presented here is scientific fact, and I will defend it with my nails,” she said, holding up bright red-painted fingernails and reducing the room to laughter.

Chemicals in the Spotlight
Two chemicals in particular have come into investigators’ crosshairs in both El Salvador and Sri Lanka: 2,4-D and glyphosate. 2,4-D is a common herbicide used to control weeds, and glyphosate is the active ingredient in the world’s most popular herbicide, Roundup. Both are used worldwide, including in countless areas not affected by this distinctive form of chronic kidney disease.

The El Salvador sample of CKD patients from Ciudad Romero — the community shown to be contaminated by heavy metals — found that 100 percent and 75 percent of the patients, respectively, reported using 2,4-D and glyphosate. In Sri Lanka, both are used heavily and were found in urine samples of some sick patients.

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Data show Correlations between Increase in Neurological Diseases and GMOs

By Nancy Swanson

April 10, 2013

Glyphosate was first marketed in 1976 and its use has exploded since the advent of glyphosate-resistant, genetically engineered (GE) crops in 1995. The herbicide-resistant GE crops absorb glyphosate through direct application and from the soil and it cannot be washed off. It is in the food. Glyphosate has also been found in rivers, streams, air and rain.

The thyroid is an endocrine organ that secretes the thyroid hormone. Thyroid dysfunction has been identified with mood disorders. Depression is frequently associated with low levels of thyroid hormone (hypothyroidism), while mood elevation is often associated with high levels of thyroid hormone (hyperthyroidism). An endocrine disrupting chemical (EDC) can cause erratic behavior. Recent studies have shown links between food additives and neurotoxicity in cells and hyperactive behavior in children. Incidents have been reported of laboratory rats and farm animals exhibiting uncharacteristic aggressive and anti-social behavior on being fed a diet consisting of GMO soy or corn.

Many scientific studies have shown links between thyroid disruption and neurological diseases. “Thyroid hormones are critical for development of the fetal and neonatal brain. Hypothyroidism in either the mother or fetus frequently results in a high incidence of mental retardation. Numerous studies with rats, sheep and humans have reinforced this concept...” According to de Cock et al., “Perinatal exposure to EDCs appears to be associated with the occurrence of ASD [autism spectrum disorder] as well as ADHD. Disruption of thyroid hormone function... may offer an explanation for the observed relations....” MacSweeney et al. report, “that the mothers of 104 schizophrenic patients had: (1) a significantly higher incidence of thyroid disease than a carefully matched control group; (2) significantly more abortions, still-births and greater infant mortality. The findings and possible relevance of thyroid disease to schizophrenia are discussed.” Strong correlation was shown between cancer of the thyroid and glyphosate use on corn and soy crops and that thyroid cancer affects women more than men. It seems that women are more sensitive to thyroid disruption.
Continued from page 34 – Data show Correlations between Increase in Neurological Diseases and GMOs

The incidence and prevalence for neurological disorders have been skyrocketing. Data trends over time for neurological disorders are not readily available for two reasons: they are not as well-studied as other diseases (cancer, diabetes etc.), and the diagnostic methods keep changing. The experts argue over whether the increases are real, or a by-product of changes in diagnostics along with greater attention given to these disorders in recent times. For example, a former diagnosis of mental retardation might now result in a diagnosis of autism. Furthermore there is a large degree of overlap in symptoms. Typical manifestations of ADHD, such as distractibility or hyperactivity are also present in pediatric bipolar disorder, for example.

Children

**ADHD** According to the [New York Times](https://www.nytimes.com/), “an estimated 6.4 million children ages 4 through 17 had received an A.D.H.D. diagnosis at some point in their lives, a 16 percent increase since 2007 and a 41 percent rise in the past decade.” From the Center for Disease Control (CDC), “rates of ADHD diagnosis increased an average of 3% per year from 1997 to 2006 and an average of 5.5% per year from 2003 to 2007. ... It is not possible to tell whether this increase represents a change in the number of children who have ADHD, or a change in the number of children who were diagnosed.” It also makes a great deal of difference who is doing the reporting: parents or doctors. The disorder affects boys more than girls. Whatever the numbers, there seems to be an increasing behavioral problem with our youth. Our solution is to give them more chemicals in the form of mood-altering drugs.

**Bipolar** According to a 2007 report by [Moreno et al.](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1914448/), “the annual number of office-based visits with a diagnosis of bipolar disorder was estimated to increase in youth from 25 (1994-1995) to 1003 (2002-2003) per 100,000 population, whereas in adults it increased from 905 (1994-1995) to 1679 (2002-2003) per 100,000 population. ... most youth bipolar disorder visits were by males (66.5%), whereas most adult bipolar disorder visits were by females (67.6%).”

**Autism** The number of autistic children has exploded during the last decade, and some are calling it an epidemic. There is great controversy over what is causing this and whether all of it is real. “But many researchers now say that at least part of the rise in autism is real and caused by something in the environment. Rather than quibbling over recounts they are focusing on finding the causes.”

It was shown in previous articles that there has been a huge increase in the amount of [glyphosates](https://www.epa.gov/pesticides/glyphosate) applied to corn and soy crops grown in the U.S. corresponding to the rise in the percentage of corn and soy planted with genetically engineered (GE) varieties. Those data represent only a portion of the total GE crops and amount of glyphosates applied. The USDA only collects data on GE crops for corn, cotton and soy. Since most of the corn (88%) and soy (94%) planted now is GE, these data give a representation of the rising trends in both GE crops and herbicide use.

The amount of glyphosate applied to U.S. corn and soy crops is plotted against the prevalence of autism in one of the slide show graphs. The prevalence of autism was difficult to find and the values shown on this graph came from many sources using different methods and different age groups. A better estimate was obtained from the U.S. Department of Education, which keeps track of school age children receiving services under the Individuals with Disabilities Education Act (IDEA). A second plot is shown using data from USDE for the number of autistic children receiving services. The correlation is quite strong which may indicate that glyphosate is a contributing factor in the rise of autism.

**Elderly: Alzheimer's and senile dementia**

The elderly are susceptible because they may already have a great body burden of chemical exposure over their lifetime and because some of their body processes are shutting down and hormonal disruptions can have a much greater effect on them.

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Continued from page 35 – Data show Correlations between Increase in Neurological Diseases and GMOs

According to the University of Washington Institute for Health Metrics and Evaluation, Alzheimer's disease went from number 32 in 1990 to number nine in 2010 in the ranking of leading causes of death in the U.S. Senile Dementia and it's care costs have also skyrocketed in the last two decades.

Prevalence and incidence data were sparse, but data on death rates were available from 1979. Graphs of the death rates for Alzheimer's and Senile Dementia have been plotted against glyphosate applications to U.S. corn and soy crops (see slide show). Again, the correlations are quite strong. Deaths due to Alzheimer's have been rising since 1980, but there is a sharp spike in 1999.

Correlation does not necessarily imply causation and there are now a host of chemicals in our food and our environment. The huge increase in the amount of glyphosate applied to GE food and feed crops has significantly increased our exposure to endocrine disrupting chemicals.

In a previous article, correlations were shown between glyphosate use, GMO crop increase and: thyroid cancer, liver cancer, obesity, high blood pressure, acute kidney injury, incidence and prevalence of diabetes and end stage renal disease. All of these diseases and disorders were carefully chosen based on:
1. Glyphosate is a known endocrine disruptor.
2. Endocrine disruptors can cause organ and neurological damage.
3. Roundup™ and GMOs have shown liver and kidney damage and abnormal behavior in rat studies.
4. Use of glyphosate on herbicide-resistant crops has skyrocketed since 1995.
5. Incidence, prevalence and deaths due to these diseases has also skyrocketed since 1995.

It seems improbable that the correlations in the nine graphs of glyphosates and organ disease, and the three presented here (for a total of 12), can all be coincidence.

There has been a trend among the agricultural and food industries and their regulators to engage in practices that place the consumers at risk, emerging in the mid-1990s and growing. It involves not just GMOs but many other things as well and those factors may may be correlated with each other. That may make it impossible to separate out which one caused a particular effect. Much more research needs to be done. Our children are disturbed and our elders are dying horribly.

Acknowledgment: Jon Abrahamson helped with data mining for this article.

Notes:
In 2006 Irena Ermakova reported to the European Congress of Psychiatry that, “As in previous series the behavior of males from GM group was compared with the behavior of control rats. Obtained data showed a high level of anxiety and aggression in males, females and young pups from GM groups. Aggression was more expressed in females and rat pups: they attacked and bite each other and the worker.” 14th European Congress of Psychiatry, Nice, France, Sunday, March 5 2006, Poster #048.

Numerous anecdotal reports of animals on GMO diets behaving aggressively and anti-socially have been reported by farmers and veterinarians.

In 2010 Shelton et al, published a paper describing potential mechanisms linking pesticides and autism.
In 2006, Grandjean and Landrigan reported on developmental neurotoxicity of industrial chemicals. “Neurodevelopmental disorders such as autism, attention deficit disorder, mental retardation, and cerebral palsy are common, costly, and can cause lifelong disability. ... Exposure to these chemicals during early fetal development can cause brain injury at doses much lower than those affecting adult brain function.”

Data sources:
Alzheimer's & Senile Dementia death data: CDC compressed mortality files

Autism prevalence: CDC:

Autism IDEA data: 1992-1998
1999-2010
http://nces.ed.gov/FastFacts/display.asp?id=64

U.S. Dept. of Education, National Center for Education

Glyphosate: USDA:NASS National Agricultural Statistics Service (NASS)

Percent GE corn & soy data:
2000-2012 data: USDA:NASS National Agricultural Statistics Service

Suggested by the author:

- Data trends show correlation between increase in organ disease and GMOs
- GMOs are prevalent in the U.S. food supply
- GMO crops increase pesticide use (Photos)


Popular Herbicide more Deadly to Liver Cells than its Active Chemical Alone

Aug 18, 2009

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All formulations were more potent than purified glyphosate (at similar levels to R360) in causing cell death. Surprisingly, R400 containing less glyphosate was more toxic to human liver cells than R450. In the study, exposure of a single gene regulated by either estrogen or androgen hormones demonstrated that all formulations disrupt hormone function more efficiently than purified glyphosate. The findings show that the formulations act against the hormones to produce anti-estrogenic and anti-androgenic effects.

http://www.environmentalhealthnews.org/ehs/newscience/roundup-mix-more-toxic-to-liver-cells-than-glyphosate/

New Review Links Roundup to Diabetes, Autism, Infertility and Cancer

April 18, 2013

A new peer-reviewed scientific review paper has been released in the US stating that glyphosate-based herbicides such as Roundup are contributing to gastrointestinal disorders, obesity, diabetes, heart disease, depression, autism, infertility, cancer and Alzheimer’s disease.

The review paper states that “glyphosate enhances the damaging effects of …food borne chemical residues and environmental toxins. Negative impact on the body is insidious and manifests slowly over time as inflammation damages cellular systems throughout the body. Here, we show how interference with CYP enzymes acts syner-

gistically with disruption of the biosynthesis of aromatic amino acids by gut bacteria, as well as impairment in serum sulfate transport. Consequences are most of the diseases and conditions associated with a Western diet, which include gastrointestinal disorders, obesity, diabetes, heart disease, depression, autism, infertility, cancer and Alzheimer’s disease.”

For the full study click here.

“The paper gives good arguments why it’s vital to oppose the recent capitulation by UK supermarkets to accepting products from animals raised on GM feed,” GM Watch stated.

Glyphosate (N-phosphonomethylglycine), the active ingredient in the herbicide Roundup®, is the main herbicide in use today in the United States, and increasingly throughout the World, in agriculture and in lawn maintenance, especially now that the patent has expired. 80% of genetically modified crops, particularly corn, soy, canola, cotton, sugar beets and most recently alfalfa, are specifically targeted towards the introduction of genes resistant to glyphosate, the so-called “Roundup Ready® feature”. In humans, only small amounts (~2%) of ingested glyphosate are metabolized to aminomethylphosphonic acid (AMPA), and the rest enters the blood stream and is eventually eliminated through the urine.

Studies have shown sharp increases in glyphosate contamination in streams in the Midwestern United States following the mid 1990s, pointing to its increasing role as the herbicide of choice in agriculture. A now common practice of crop desiccation through herbicide administration shortly before the harvest assures an increased glyphosate presence in food sources as well. The industry asserts that glyphosate is nearly nontoxic to mammals, and therefore it is not a problem if glyphosate is ingested in food sources. Acutely, it is claimed to be less toxic than aspirin. As a consequence, measurement of its presence in food is practically nonexistent.

A vocal minority of experts believes that glyphosate may instead be much more toxic than is claimed, although the effects are only apparent after a considerable time lapse. Thus, while short-term studies in rodents have shown no apparent toxicity, studies involving life-long exposure in rodents have demonstrated liver and kidney dysfunction and a greatly increased risk of cancer, with shortened lifespan.

FEATURED ARTICLES

Wide Range of Diseases Linked to Pesticides

Database Supports Policy Shift from Risk to Alternatives Assessment

By Kagan Owens, Jay Feldman and John Kepner
Pesticide-Induced Diseases Database
Beyondpesticides.org

The common diseases affecting the public’s health are all too well-known in the 21st century: asthma, autism and learning disabilities, birth defects and reproductive dysfunction, diabetes, Parkinson’s and Alzheimer’s diseases, and several types of cancer. Their connection to pesticide exposure continues to strengthen despite efforts to restrict individual chemical exposure, or mitigate chemical risks, using risk assessment-based policy.

The Pesticide-Induced Diseases Database, launched by Beyond Pesticides, facilitates access to epidemiologic and laboratory studies based on real world exposure scenarios that link public health effects to pesticides. The scientific literature documents elevated rates of chronic diseases among people exposed to pesticides, with increasing numbers of studies associated with both specific illnesses and a range of illnesses. With some of these diseases at very high and, perhaps, epidemic proportions, there is an urgent need for public policy at all levels – local, state, and national—to end dependency on toxic pesticides, replacing them with carefully defined green strategies.

Data Supports Policy Change

The database is a tool to support efforts to eliminate the continued use of hazardous pesticides in favor of green strategies that emphasize non-toxic and least-toxic alternative practices and products. The studies in the database show that our current approach to restricting pesticide use through risk assessment-based mitigation measures is not working. This failed human experiment must be ended. The warnings of those who have expressed concerns about risk assessment, such as EPA Administrator under Presidents Nixon and Reagan, William Ruckelshaus, have been borne out by three decades of use and study. Mr. Ruckelshaus in 1984 said, “We should remember that risk assessment data can be like the captured spy: If you torture it long enough, it will tell you anything you want to know.” EPA’s risk assessment fails to look at chemical mixtures, synergistic effects, certain health endpoints (such as endocrine disruption), disproportionate effects to vulnerable population groups, and regular noncompliance with product label directions. These deficiencies contribute to its severe limitations in defining real world poisoning, as captured by epidemiologic studies in the database.

An enlightened policy approach to proposed or continued toxic chemical use, in an age where the adverse effects have been widely and increasingly documented, is to first ask whether there is a less toxic way of achieving the toxic chemical’s intended purpose. Simply, “Is there another practice that would make the substance unnecessary?” This approach does not preclude and should demand the prohibition of high hazard chemical use, those chemicals that are simply too dangerous.

The alternatives assessment approach differs most dramatically from a risk assessment-based policy is in rejecting uses and exposures deemed acceptable under risk assessment calculations, but unnecessary because of the availability of safer alternatives.

For example, in agriculture, where the database shows clear links to pesticide use and cancer, it would no longer be possible to use hazardous pesticides, as it is with risk assessment-based policy, when there are clearly effective organic systems with competitive yields that, in fact, outperform chemical-intensive

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agriculture in drought years. Cost comparisons must take into account externalities such as water pollution and water utility expenses, associated with chemical-intensive farming. The same is true for home and garden pesticide use and defined integrated pest management systems with prescribed practices and only specific substances as a last resort.

The database suggests clearly that we must take strategic action to shift away from pesticide dependency. Public policy must advance this shift, rather than continue to allow unnecessary reliance on pesticides. Regulatory restrictions must be tied to alternatives assessment that move chemicals off the market or prohibit their marketing as safer approaches and technologies emerge.

About the Database
In order to track the varying public health effects of pesticide exposure, Beyond Pesticides has established the Pesticide-Induced Diseases Database, which tracks diseases and other health issues linked to real world pesticide exposure, providing access to published studies and their findings. The database is housed on the Beyond Pesticides website at www.beyondpesticides.org/health, as it requires periodic updating. The current database, which contains hundreds of studies, itself is preliminary and will be added to over the coming months. We urge readers to send studies to info@beyondpesticides.org that you think should be added to the database.

Findings and Database Entries

Alzheimer’s Disease
According to the Alzheimer’s Association, Alzheimer’s disease (AD), the most common form of dementia, is a progressive and fatal brain disease. As many as 5.3 million Americans are living with Alzheimer’s disease. Alzheimer’s destroys brain cells, causing memory loss and problems with thinking and behavior severe enough to affect work, lifelong hobbies or social life. Alzheimer’s gets worse over time, it is fatal, and has no current cure.

At publication, the database lists 4 studies linking pesticides to Alzheimer’s disease. While many studies link pesticides to neurological effects, research is just beginning to make the link between pesticides and AD. A recent study of individuals from an agricultural community in Utah shows increased risks among pesticide-exposed individuals for all causes of dementia (hazard ratio, HR, 1.38) and an even greater risk for AD (HR 1.42). The risk of AD associated with organophosphate exposure is the greatest (HR 1.53)

Asthma
Since the mid-1980s, asthma rates in the U.S. have skyrocketed to epidemic levels, particularly in young children. In the U.S. alone, around 16 million people suffer from asthma. Asthma is a serious chronic disorder, and in some cases life-threatening disease, of the lungs characterized by recurrent attacks of bronchial constriction, which cause breathlessness, wheezing, and coughing. Researchers have found that pesticide exposure can induce a poisoning effect linked to asthma.

Low-income populations, people of color, and children living in inner cities experience disproportionately high morbidity and mortality due to asthma. According to the National Institutes of Health’s National Institute of Allergy and Infectious Disease, African Americans are four to six times more likely than whites to die from asthma. Therefore, any time our policies allow regulators to permit uses of pesticides with known asthma effects, which is done daily, a disproportionate impact is felt in the African-American community. Among other policies, this toxics policy contributes to a cycle of poverty, as asthma is the leading cause of school absenteeism due to chronic illness.

At publication, the database lists 41 studies linking pesticides to asthma. Studies show that pesticides not only trigger asthma attacks, but are also a root cause of asthma. A landmark 2004 study finds that not only do environmental exposures lead to above-average asthma rates among children, but that timing of exposure is also crucial. Examining over 4,000 school-aged children in California, the researchers discovered that children exposed to herbicides during their first year of life are four and a half times more likely to be diagnosed with asthma before the age of five; toddlers exposed to insecticides are over two times more likely to get asthma.

Birth and Fetal Defects
In 2005, the births of three babies born in Florida with severe birth defects to mothers who all worked for Ag-Mart Produce, a company that produces chemically-treated tomatoes and other agricultural products, brought the connection between birth defects and pesticide exposure into the public consciousness.

Birth defects are structural or functional abnormalities present at birth that cause physical or mental disabilities, ranging from mild to fatal. Researchers have identified thousands of different types of birth defects. Currently, birth defects are the leading cause of death for infants during the first year of life.
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At publication, the database lists 19 studies linking pesticides to fetal and birth defects. A study published in the April 2009 issue of the medical journal Acta Paediatrica reports that the highest rates of birth defects for U.S. babies arise when conception occurs during the spring and summer months, when pesticide use increases and high concentrations of pesticides are found in surface waters. A strong association is found between higher rates of birth defects, including spina bifida, clubfoot and Down’s syndrome, among women who conceive while nitrates, atrazine and other pesticides are at the high end of their seasonal fluctuations.

Cancer

The link between pesticides and cancer has long been a concern. While agriculture has traditionally been tied to pesticide-related illnesses, 19 of 30 commonly used lawn pesticides and 28 of 40 commonly used school pesticides are linked to cancer. Even with the growing body of evidence linking environmental exposures to cancer in recent years, a report released May 6, 2010 by the President’s Cancer Panel finds that the true burden of environmentally-induced cancer is greatly underestimated. The Panel’s report, Reducing Environmental Cancer Risk: What We Can Do Now, concludes that while environmental exposure is not a new front on the war on cancer, the grievous harm from carcinogenic chemical use has not been addressed adequately by the nation’s cancer program.

At publication, the database lists 260 studies linking pesticides to various forms of cancer (see specific types of cancer below). While a number of published scientific studies using animal toxicity data and human cells/tissue laboratory studies show that pesticides are known or suspected to be carcinogenic, epidemiologic studies confirm laboratory results. The review finds a significant association between cancer and pesticides used in agriculture and throughout the urban environment in homes, schools, and public places.

Brain Cancer – There are two main types of brain cancer. Primary brain cancer starts in the brain. Metastatic brain cancer starts somewhere else in the body and moves to the brain. According to the American Brain Tumor Association, brain tumors are the most common of the solid tumors in children, and the second most frequent malignancy of childhood. Brain tumors are the second leading cause of cancer-related deaths in males under 40 and the second leading cause of cancer-related deaths in females under age 20.

At publication, the database lists 30 studies linking pesticides to brain cancer. Researchers believe that insecticides that target the nervous system may play a role in the development of brain tumors.

A population-based, case control study of children ten years of age or younger that analyzes functional genetic polymorphisms and parents’ use of home insecticide treatments suggests that exposure in childhood to insecticides in combination with a reduced ability to detoxify them increases the risk of developing brain tumors. Several studies show adults with brain cancer are more likely to have been exposed to pesticides.

Breast Cancer – Doctors estimate that one in eight women will be diagnosed with breast cancer in their lifetime. It is the leading cause of death in North America for women 35 to 50 years old. Genetics can only account for five to ten percent of cases.

According to the Breast Cancer Fund, a growing body of scientific evidence suggests that exposures to toxic chemicals, including pesticides, in the environment are contributing to high breast cancer rates.

At publication, the database lists 11 studies linking pesticides to breast cancer. Some pesticides are breast carcinogens and others act by disturbing or mimicking hormones in the body, which can lead to breast cancer. (See Endocrine Disruption section.) A 2006 Long Island Breast Cancer Study Project report demonstrates that self-reported lifetime use of residential pesticides is associated with an increase in risk for breast cancer. The increase is found for women who report the use of pesticides overall, specifically lawn and garden pesticides, and is particularly high for households with professional applications.

Leukemia – Cancer of the blood-forming cells of bone marrow, leukemia is the most common childhood cancer, accounting for 33 percent of the incidence of all childhood cancer and causing more deaths among children and adults under the age of 20 than any other cancer, yet strikes ten times as many adults as children. Several published studies show a “critical window of exposure” to pesticides, whether used in the home or from parental occupational exposure, that are associated with leukemia in children, showing an especially high risk correlation with pesticide exposure during the mother’s pregnancy.

At publication, the database lists 40 studies linking pesticides to leukemia. Studies link leukemia to both residential and agricultural exposure to pesticides, for adults, children and in utero. One case-control study in California finds household pesticide use can nearly quadruple the risk of childhood leukemia (odds ratio, OR, 3.8) and that garden pesticides increase the risk to over six-fold (OR 6.5).
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A retrospective cohort mortality study of aerial pesticide applicator pilots, finds a significantly elevated risk for leukemia (OR 3.35).  

**Lymphoma** – Cancers that originate in the lymph system are referred to as lymphomas and include Hodgkin’s lymphoma (HL) and non-Hodgkin’s lymphoma (NHL). Lymphomas are the most common type of blood cancer in the U.S. It is the 7th most common in adults and the 3rd most common cancer in children. The more common non-Hodgkin’s lymphoma is a cancer of the immune system.

The incidence of NHL has been increasing over the past several decades and has doubled since the early 1970s.

At publication, the database lists 46 studies linking pesticides to lymphoma. According to the Lymphoma Foundation of America, 75 out of all 99 epidemiologic studies conducted on lymphoma and pesticides find a link between the two. The report states that data from the National Cancer Institute show that people develop lymphoma often in states and locations with the highest pesticide use. The report finds that farmers are at the highest risk for lymphoma.

Dozens of studies in the database confirm the risk to farmers and other pesticide applicators.

**Prostate Cancer** – Cancer of the prostate, a gland of the male reproductive system, is the second most common cancer among American men, with one in six men diagnosed during their lifetime. It is also the second leading cause of death for American men. Incidence and death trends show that prostate cancer has been slightly decreasing since 1994.

At publication, the database lists 23 studies linking pesticides to prostate cancer. Studies show elevated rates of prostate cancer in Vietnam veterans exposed to Agent Orange and to farmers and others with occupational pesticide exposure. A study published in 2003 in the International Journal of Cancer shows that individuals who have worked in agriculture have a 40% increased risk of having prostate cancer over the general population.

Other studies suggest that endocrine disruption is likely to be a mechanism for developing this type of cancer.

**Soft Tissue Sarcoma**

Cancer that begins in the muscle, fat, fibrous tissue, blood vessels, or other supporting tissue of the body, known as soft tissue sarcoma, is uncommon, yet risk is increased with exposure to certain chemicals, radiation therapy and certain genetic diseases.

At publication, the database lists 7 studies linking pesticides to soft tissue sarcoma. A 1995 case-control study of Denver children finds that yard pesticide applications are linked to a four-fold increase in risk to soft tissue sarcomas (OR 4.0).

Other studies associate living near agricultural areas with the disease.

**Other Cancers** – With so many pesticides on the market and possible combinations for exposure, there are scores of different types of cancers with scientific links to pesticides. As the President’s Cancer Panel points out, “Approximately 40 chemicals classified by the International Agency for Research on Cancer (IARC) as known, probable, or possible human carcinogens, are used in EPA-registered pesticides now on the market.”

At publication, the database lists 105 studies linking pesticides to other types of cancers. These include cancer of the bladder, bone, cervix, colon, eye, gallbladder, kidney/renal, larynx, lip, liver, lungs, mouth, esophagus, ovarian, pancreas, rectum, sinus/nasal, stomach, testicles and thyroid, as well as melanoma (a form of skin cancer), multiple myeloma (cancer of the plasma cells of bone marrow) and neuroblastoma (cancer of the nerve cells).

**Developmental and Learning Disorders**

Roughly one in six children in the U.S. has one or more developmental disabilities, ranging from a learning disability to a serious behavioral or emotional disorder. Scientists believe that the amount of toxic chemicals in the environment that cause developmental and neurological damage are contributing to the rise of physical and mental effects being found in children. Studies show children’s developing organs create “early windows of great vulnerability” during which exposure to pesticides can cause great damage. In the U.S., requirements for testing pesticides and other chemicals for potential developmental and learning disorders are minimal.

A developing brain is much more susceptible to the toxic effects of chemicals than an adult brain. During development, the brain undergoes a highly complex series of processes at different stages. Interference from toxic substances that disrupt these processes can have permanent consequences. That vulnerability extends from fetal development through infancy and childhood to adolescence. Research has shown that environmental toxicants, such as pesticides, at low levels of exposure can have subclinical effects—not clinically visible, but still important adverse effects, such as decreases in intelligence or changes in behavior.

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At publication, the database lists 26 studies linking pesticides to learning and developmental disorders. These include general developmental delays, attention deficit hyperactivity disorder (ADHD) and autism. A 2009 study published in the journal Pediatrics links a mother’s exposure to urban air pollutants known as polycyclic aromatic hydrocarbons (PAHs), which include pesticides, to a reduced intelligence quotient (IQ) in their children.11

Attention Deficit Hyperactivity Disorder – Attention Deficit Hyperactivity Disorder is a neurobehavioral developmental disorder that causes inattention, impulsivity, and hyperactivity. It is estimated that around two million children in the U.S. have ADHD.

At publication, the database lists 8 studies linking pesticides to ADHD. In one study linking ADHD to pesticide exposure, scientists from the University of Montreal and Harvard University examine data from the National Health and Nutrition Examination Survey (NHANES), a program of studies designed to assess the health and nutritional status of adults and children. The study shows that for children with a 10-fold increase in the concentration of dialkyl phosphate metabolites in their urine (an indicator of organophosphate exposure) the odds of ADHD increase by more than 50%. For the breakdown product dimethyl triophosphate, the odds of ADHD almost double in kids with above-average levels compared to those without detectable levels.12

Autism – This complex developmental disorder, which is on the rise in both prevalence and incidence, includes behavioral problems with social interaction and communication. The symptoms range from mild to very severe, appearing before the age of three and lasting throughout a person’s life. Research has shown that people with autism have certain irregularities in several regions of the brain and/or abnormal levels of serotonin or other neurotransmitters in the brain, suggesting that autism is associated with the disruption of normal brain development early in fetal development.

At publication, the database lists 5 studies linking pesticides to autism.

A study published in the October 2007 issue of Environmental Health Perspectives shows that children born to mothers living near agricultural fields, where organochlorine pesticides, specifically endosulfan and dicofol, are applied during their first trimester of pregnancy, are six times more likely to have children that develop autism.13

Diabetes

According to the American Diabetes Association, diabetes is a group of diseases characterized by high blood glucose levels that result from defects in the body’s ability to produce and/or use insulin. Type 1 diabetes is usually diagnosed in children and young adults. In type 1 diabetes, the body does not produce insulin. Type 2 diabetes is the most common form of diabetes and is most common in communities of color and the aged population. In type 2 diabetes, either the body does not produce enough insulin or the cells ignore the insulin. Pesticides and other environmental factors are almost always linked to type 2 diabetes.

At publication, the database lists 6 studies linking pesticides to diabetes. Several studies show that pesticides and other pollutants can elevate the risk of type 2 diabetes by 20% to more than 100%. A study by the National Institutes of Health (NIH) finds pesticide applicators with regular exposure to pesticides are at greater risk for type 2 diabetes. Applicators that had used certain insecticides more than 100 lifetime days nearly doubled their diabetes risk.14

Parkinson’s Disease

The second most common neurodegenerative disease, Parkinson’s disease (PD) occurs when nerve cells in the substantia nigra region of the brain are damaged or destroyed and can no longer produce dopamine, a nerve-signaling molecule that helps control muscle movement. People with PD have a variety of symptoms including loss of muscle control, trembling and lack of coordination. They may also experience anxiety, constipation, dementia, depression, urinary difficulties, and sleep disturbances. Over time, symptoms intensify. At least one million Americans have PD and about 50,000 new cases are diagnosed each year. With less than one percent of cases caused by genetics, researchers have been looking for the potential risk factors for developing Parkinson’s disease (PD). The epidemiological and toxicological evidence is repeatedly identifying exposure to pesticides, as well as specific gene-pesticide interactions, as significant adverse risk factors that contribute to PD.

At publication, the database lists 65 studies linking pesticides to Parkinson’s disease. In a review of 40 epidemiological case-control studies from 1983-2005 published in the journal Environmental Health Perspectives, researchers evaluated the relationship between PD and pesticide exposure, finding sufficient evidence that an association exists and is strongest for exposure to herbicides and insecticides, and after long durations of exposure.15

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Endocrine Disruption
Common household products – detergents, disinfectants, plastics, and pesticides – contain chemical ingredients that enter the body, disrupt hormones and cause adverse developmental, disease, and reproductive problems. Known as endocrine disruptors, these chemicals, which interact with the endocrine system, wreak havoc in humans and wildlife. The endocrine system consists of a set of glands (thyroid, gonads, adrenal and pituitary) and the hormones they produce (thyroxine, estrogen, testosterone and adrenaline), which help guide the development, growth, reproduction, and behavior of animals, including humans. Hormones are signaling molecules, which travel through the bloodstream and elicit responses in other parts of the body.

Endocrine disruptors function by: (i) Mimicking the action of a naturally-produced hormone, such as estrogen or testosterone, thereby setting off similar chemical reactions in the body; (ii) Blocking hormone receptors in cells, thereby preventing the action of normal hormones; or (iii) Affecting the synthesis, transport, metabolism and excretion of hormones, thus altering the concentrations of natural hormones. Endocrine disruptors have been linked to attention deficit hyperactivity disorder (ADHD), Parkinson’s and Alzheimer’s diseases, diabetes, cardiovascular disease, obesity, early puberty, infertility and other reproductive disorders, and childhood and adult cancers.

More than 50 pesticide active ingredients have been identified as endocrine disruptors by the European Union and endocrine disruptor expert Theo Colborn, PhD.

Endocrine disruption is the mechanism for several health effect endpoints. See the related sections (Cancer, Developmental and Learning Disorders, Parkinson’s disease, Reproductive Health) for more information.

Reproductive Health Effects
A robust body of literature details reproductive effects in fish, amphibians, and reptiles related to exposure to endocrine disruptors. Evidence of these effects has also been seen in wild mammals such as polar bears and seals. Environmental exposure assessments and wildlife, laboratory and epidemiologic studies show exposure to low-level environmental contaminants, such as pesticides and other chemicals, subtly undermines the ability to reproduce. The study of endocrine disruption is revealing mechanisms that show how specific environmental contaminants can alter fertility. Laboratory animal experiments have confirmed these wildlife findings.

At publication, the database lists 22 studies linking pesticides to reproductive health effects. These include decreased fertility in both males and females, antiandrogenic (demasculinizing) effects, increased rates of miscarriage, altered sex ratios and altered maturity. A 2006 study published in the journal Epidemiology has found inverse associations between pesticides and male testosterone levels. The study found that high levels of the urinary metabolites of chlorpyrifos (TCPY) and carbaryl and naphthalene (1N) correlate directly with low levels of testosterone in male subjects.16

A number of epidemiological studies and animal laboratory experiments that show strong associations or linkages between infertility rates and exposure to pesticides support the conclusions of this study.

View Beyond Pesticides’ full Pesticide-Induced Diseases Database at www.beyondpesticides.org/health

Selected Citations

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Continued from page 31 - Soy-Based Lunch kills 22 Children in India: Have GMOs and Pesticides become Instant Killers?

After learning about the school's mismanagement of the situation, many parents began rioting in the streets and demanding answers. Protesting villagers reportedly set ablaze four police vehicles out of anger, and police reinforcements had to be sent in from elsewhere to quell the unrest. In the aftermath of the disaster, Bihar has offered to provide compensation of 200,000 rupees, or about $3,500, per dead child to affected families.

All government food programs, including those in US, a threat to children

Though this incident took place in one of India's poorest regions, where corruption is rampant, the moral of the story is that this type of situation could happen anywhere. In the U.S., for instance, where the federal government is currently seizing control of school lunch programs nationwide, children are being fed some of the very same soy- and chemical-laden garbage for lunch.

Just last year, prisoners in Illinois actually filed a lawsuit against the state for serving them too much soy, which was causing them to become seriously ill. And a district court judge has since acknowledged the merits of the case, recognizing that high amount of soy, and particularly GM soy, can lead to severe gastrointestinal problems, hypothyroidism, infections, and even death.

"In the U.S., we allow Big Agra to provide insecticide laced GMOs for our children everyday," wrote one concerned and insightful commenter on a piece published by The New York Times (NYT). "We have no idea how much damage this stuff is doing to our children or the rest of the humans who are being slowly poisoned for the benefit of high profits and obscenely paid CEOS."

"At least the Indian government intends to prosecute the ones who did this. We (in the U.S.) put them at the head of the FDA and give them complete immunity through specially drafted legislation. This is our shame and our tragedy."

Sources for this article include:
http://www.independent.co.uk
http://india.blogs.nytimes.com
http://www.naturalnews.com/034800_prisoners_lawsuit_soy.html

"We are circumvented today by environments more dangerous than those which circumvented other peoples in any other age. We are face to face with environments in a civilization that is highly developed; a civilization that is competing with itself for its own destruction; a civilization that cannot last, because it has no spiritual foundation; a civilization that is vicious, crafty, dishonest, immoral, irreligious and corrupt."

Marcus Garvey
What do Pesticides, Herbicides and Antibiotics have in Common?

By Case Adams

July 22, 2013

There are three natural catastrophes occurring within nature in slow motion at the moment and they are our fault. All three catastrophes stem from the same kind of mistake made by human science and corporate greed. What are they and what are we doing wrong?

The slow-motion catastrophes are:

- antibiotic-resistant pathogenic bacteria – often termed 'superbugs'
- pesticide-resistant pests – also called 'superbugs'
- herbicide-resistant weeds – now termed 'superweeds'

What do these three have in common?

All three are the result of the application of synthetic toxicity within nature in an attempt to work outside nature's normal processes. The application of toxins meant to inhibit certain organisms produces resistance, because living organisms by nature seek to survive, and will adapt to toxicity in order to continue their survival.

This ability to adapt has been studied for many years by scientists and is well known among biology and evolution science. It is one of the foundations of biology taught at the most fundamental levels of instruction for any beginning scientist.

Yet the scientific community has failed to understand how this most fundamental part of nature will interact with the toxicity that we have introduced over the past century. Did the scientists who developed these synthetic toxins really believe those toxins would provide a permanent solution?

We obviously ignored this most fundamental understanding that living organisms will adapt to toxins. We forgot that organisms will develop defense mechanisms that will override deterrent toxins - producing a stronger organism in the process.

Let's examine this aspect in all three cases:

Anti-biotics Produce Plasmid changes

Antibiotics – or antibacterials – exist in nature, but modern synthetic (static) antibiotics began their development in the nineteenth century among early microbiologists who discovered ways to combat disease by inhibiting bacteria with either antiseptic chemicals or infused antibiotics derived from other microorganisms. Their discoveries led to major advancements in knowledge regarding how to kill bacteria. For example, the Italian Vincenzo Tiberio discovered that the Penicillium mold would remove bacteria from well water.

These of course were noble causes and their discoveries have resulted in millions of lives saved from various infections. But is there a long-term cost of waging war against bacteria outside of nature's means - using static toxins?

Later scientists found that bacteria will produce what is called a plasmid – a term suggested by Joshua Lederberg in the early 1950s. A plasmid is a collection of genetic material passed on during procreation and even peer-exchange that teaches a bacteria how to resist that particular antibacterial. Even a single bacterium may develop a plasmid change and then pass that plasmid change on to others – both within and outside their species. This passing on of plasmid changes allows bacteria to teach others how to resist that particular toxic agent.

We might compare this to warfare among humans. Once we began fighting with swords, the opponents developed shields. After humanity created missiles, the opposition developed anti-missile weapons. After we created nuclear bombs we created nuclear defense mechanisms and bomb shelters.

Bacteria are no different. They are also living organisms who want to survive, so they can learn how to evade an antibacterial agent.

The only problem is that as this escalation continues, those who position themselves as enemies will now be dealing with a stronger organism. This is the case of antibiotic-resistant species of bacteria such as MRSA (Methicillin-resistant Staphylococcus aureus) and numerous species that cause HAIs – hospital acquired infections.

The same exact premise is taking place among weeds. Since 2000 the increasing application of glyphosate has produced a growing legion of superweed horseweeds and other types of herbicide-resistant weeds.

The Growth of Superweeds from Herbicides and GMOs

In a recent paper by Food & Water Watch, the dramatic rise in the application of herbicides in the U.S. over the last 10 years has led to a growing legion of superweeds. In the 2013 report, called Superweeds: How Biotech

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Continued from page 46 - What do Pesticides, Herbicides and Antibiotics have in Common?

Crops Bolster the Pesticide Industry, found that the dramatic rise in the application of herbicides such as glyphosate between 2001 and 2010 has led to an explosion of growth of herbicide-resistant weeds.

From 2001 to 2010, toxic herbicide application grew by 81 million pounds – 26 percent. But the application of glyphosate to the three biggest genetically engineered crops skyrocketed from 15 million pounds in 1996 to 150 million pounds in 2012 – this is a ten-fold rise in the application of glyphosate.

Prior to the domination of glyphosate and genetically modified "RoundUp Ready" seeds, atrazine was the leading herbicide used. Both atrazine and glyphosate have been linked to endocrine disruption, and atrazine has been the subject of study by university researchers for its causing mutations among frogs and fish.

As a result of the growth of GMO herbicide-friendly seeds, glyphosate-resistant weeds have been reported in 21 states – up from zero states reporting prior to 2000. The resistant weeds began in the South and spread to other states. By 2012, 92% of Georgia farmers reported glyphosate-resistant weeds, and states throughout the Midwest were being swamped by them.

These resistant weeds include ragweed, amaranth, horseweed, bluegrass and waterhemp. Ragweed of course is also a common hayfever allergen – and hayfever is also on the rise in the U.S.

SuperPest Growth from Increasing Pesticide Use
A similar problem is appearing as a result of the growing application of pesticides onto genetically modified crops. Research from the University of Minnesota found that the corn rootworm is developing a resistance to GMO corn and the pesticides applied to it such as Bt and 2,4-D. A recent interview with agronomist Todd Claussen from the Brownfield publication indicates that Iowa farmers are dealing with 40 to 50 times the rootworm infection considered normal – and he attributes this to resistance to soil insecticides.

What do these mistakes have in common? All three were produced by scientists forgetting the fundamental biology lesson that every living organism strives to survive and thus will adapt and develop resistance to toxins that attempt to interrupt that survival.

And the consequences of these adaptations mirror the attempts to inhibit them. In the case of the application of static antibiotics, we are running out of them as bacteria become resistant. In the case of the application of toxic chemicals onto pests and weeds, those pests and weeds are becoming resistant to those toxic chemicals.

There are two backlashes to these developments. The first is that we have to increase the application of these toxins in order to get similar results. This means that we become exposed to more toxins - as illustrated in all three instances: The rise in antibiotic use, pesticide use and herbicide use.

The second backlash is that as these living organisms adapt they become stronger. This means it becomes more difficult to inhibit them by any means. (Rendering the adage: "I've created a monster!")

Both of these consequences ruins it for other living organisms – including humans – which become threatened by a combination of those stronger living organisms and the increased exposure to toxins.

Is there a Solution to our Toxic Science?
The solution is to work within nature's means. This means finding those strategies that naturally inhibit those pathogenic organisms. In the case of weeds and pests, crop rotation and the feeding of organic biomass into the soil. This will enrich the soil and help strengthen the plants' own immunity against pests – can help resist pests, along with the utilization of natural predators that already exist in nature. Naturally enriching the soil will also give rise to natural stewards of plants such as earthworms – which help combat other pests and help nourish plants with their own waste production as they convert natural fertilizers.

In addition to these, there are numerous natural substances that repel pests, including castor oil, extracts of mint, basil, garlic and other natural means that utilize evolution to repel pests.

In the case of antibiotic-resistant bacteria, the solution lies in employing those natural agents – inclusive of many different antibacterial herbs – that inhibit the growth of bacteria. Another important tool are those probiotic bacteria that are already living within our bodies and can produce their own antibiotics that fight off pathogenic bacteria – as well as fungi and viruses.

The other means to protect ourselves naturally comes in the form of increasing our own natural immunity. This comes by way of a better diet, plenty of exercise and a healthy lifestyle in general.

The bottom line is that scientists and humanity in general must become better skilled in observation. This means observing nature and its consequences.

"Exposure to DDT at amounts that would be needed in malaria control might cause preterm birth and early weaning... "

Amidst staggering mortality and morbidity rates due to malaria in the African continent, African Heads of State and Government have adopted the use of dichlorodiphenyltrichloroethane (DDT), a controversial chemical, as the means of eradicating malaria in the continent. This came after several debates which commenced Wednesday July 10 at a meeting of Health Ministers of various African countries; and continued at meetings of Ambassadors and members of the Permanent Representative Council of the African Union on July 12.

The final decision for DDT adoption was arrived at after another round of debate on Tuesday July 16, during a meeting of the African heads of state and government, which ended same day. However, long before its adoption by African leaders, concerns have been raised about the negative impact of the chemical on the health of humans.

DDT is a tasteless, colourless chemical that was successfully used in the second half of World War II to control malaria among civilians and troops. It was then regarded as a contact poison against several arthropods; hence, was also used as an agricultural insecticide, while its production and use skyrocketed.

The use of the chemical was first questioned by an American biologist, Rachel Carson, who wrote about the environmental impacts of the indiscriminate spraying of DDT in the United States and questioned the logic of releasing large amounts of chemicals into the environment without fully understanding their effects on ecology or human health.

The book, Silent Spring, published in 1962, suggested that DDT and other pesticides may cause cancer and that their agricultural use was a threat to wildlife and plants. Its publication birthed the environmental movement, and resulted in a large public outcry which eventually led to DDT being banned for agricultural use in the U.S. in 1972. More than 600,000 tonnes were applied in the U.S. before the 1972 ban.

The chemical was subsequently banned for agricultural use worldwide under the Stockholm Convention, but its limited use in disease vector control continues till date, but remains controversial.

Notwithstanding the controversies, 3314 tonnes were produced in 2009 for the control of malaria.

In humans, medical researchers say it may affect health through genotoxicity or endocrine disruption. Genotoxicity involves the damage of the genetic information within a cell which then causes mutations, and which could lead to cancer. Further study results say it affects future generations of the primary affected person.

Endocrine disruption on the other hand involves negative interference of the hormone system in humans. These disruptions, results of medical researches state, can cause cancerous tumors, birth defects, and other developmental disorders. This specifically, could lead to learning disabilities, severe attention deficit disorder, cognitive and brain development problems; deformations of the body (including limbs); breast cancer, prostate cancer, thyroid and other cancers; sexual development problems.

Several African countries including Nigeria, however, argued that there were benefits in the use of the chemical. Continued on page 49
Continued from page 48 - Nigeria: African Countries Adopt Controversial Deadly Chemical, DDT, for Malaria Treatment

Nigeria, South Africa others approve

Nigeria's Minister of Health, Prof. Onyebuchi Chukwu, during the Abuja meeting, emphasized that the World Health Organization has cleared use of DDT in countries where mosquitoes are resistant to other insecticide, noting that the manner of usage is what matters.

"Some countries are using them. In the health sector, it's to be used indoors, not outdoors. It is the Agricultural sector that doesn't need DDT. We are not here for rhetorics but to seek the way forward and the summit and African Union is primarily for that purpose," he stated.

Also, the South African representative reiterated that it is important for all African leaders to eliminate malaria in Africa, thus, queried why DDT comes under attack annually whenever it is raised as a means of eradicating malaria.

"If we stop using it, we are sentencing our people to death. Every other continent used DDT to eradicate malaria, so why is our turn different in Africa?"

He said that within five years, South African had a 600 per cent increase in malaria rate from 1996 when the country stopped using DDT.

"We had no choice but revert to it. DDT must remain here until a more effective chemical is discovered. We want to emphasize that it must not be removed from our agenda on how to eradicate malaria in Africa," he said.

The Commissioner, Social Affairs of the African Union Commission, Mustapha Kaloko, called for the inclusion of DDT as the means of eradicating malaria in the region. He however noted that it is not to be generally used while food items must be covered and kept away and "only walls and ceilings are to be sprayed".

"DDT will remain in the agenda as the major means for the eradication of malaria in the continent," he said.

Consequently, all African leaders except Central African Republic which sent no delegate adopted the inclusion of DDT as the chemical to be used in eradicating malaria in the region.

Though DDT has been adopted by the African leaders as the key to eradicating malaria in the continent, fear still lingers even in Nigeria as well as other African countries over its usage. Delegates who are against its usage were however scared of having their names in print when PREMIUM TIMES spoke to them.

One of the Nigerian delegates, who was against DDT being adopted, told PREMIUM TIMES that "I want malaria eradicated but I am really scared about the negative impact this would have on the health of Africans.

DDT is a renowned controversial chemical with griev impact on health of mammals; and humans are at the worst receiving end."

Other delegates from countries like the Republic of Chad and Mozambique equally shared same views as their Nigerian counterpart.

Effects of DDT on human health

Studies from the United States, Canada, and Sweden link DDT to diabetes; while the U.S. Environmental Protection Agency states that DDT exposure damages the reproductive system and reduces reproductive success in humans. These effects, the agency says, may cause developmental and reproductive toxicity.

"Research has shown that exposure to DDT at amounts that would be needed in malaria control might cause preterm birth and early weaning ... toxicological evidence shows endocrine-disrupting properties; human data also indicate possible disruption in semen quality, menstruation, gestational length, and duration of lactation" The Lancet- a science journal also states.

According to epidemiological studies on humans, exposure to DDT could also lead to premature birth and low birth weight, and may even harm a mother's ability to breast feed.

Recently, other researchers from the United States, Canada, and Australia argued that these effects may increase infant deaths, thus, offsetting any anti-malarial benefits.

A study carried out at the University of California, Berkeley, in 2006 indicated that children exposed while in the womb have a greater chance of development problems, while other studies have discovered that even low levels of DDT at birth are associated with decreased attention at infancy as well as decreased cognitive skills.

In other related researches from around the globe, it was discovered that daughters of highly exposed women to this chemical may have more difficulty getting pregnant. This is called increased time to pregnancy, TTP, in medical parlance. Similarly, women who are exposed to the chemical in their first trimester of pregnancy (first three months) may have babies with retarded psychomotor development, while those who are unlucky could have a type of miscarriage called early pregnancy loss.

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South Africa is one country that continues to use DDT under WHO guidelines. In 1996, the country switched to alternative insecticides and malaria incidence increased dramatically. Returning to DDT and introducing new drugs brought malaria back under control.

Making a case for the pesticide, Namibia's Minister of Health, Richard Kamwir, told PREMIUM TIMES that "DDT is effective against resistant mosquitoes. Mosquitoes avoid DDT-sprayed walls and this is what we used in my country. DDT is the best pesticide for malaria control as resistant mosquitoes avoid treated houses".

He further argued that for the pesticide to be effective, at least 80 percent of houses in any vicinity must be sprayed if not, its effectiveness would be jeopardized. "People don't like DDT because of the lingering smell and stains on the walls, but I can confidently tell you that it worked for us" he added.

When to use DDT

Many global research experts however urge that alternatives be used instead of DDT.

An epidemiologist, Brenda Eskenazi, said "We know DDT can save lives by repelling and killing disease-spreading mosquitoes. But evidence suggests that people living in areas where DDT is used are exposed to very high levels of the pesticide. The only published studies on health effects conducted in these populations have shown profound effects on male fertility. Clearly, more research is needed on the health of populations where indoor residual spraying is occurring, but in the meantime, DDT should really be the last resort against malaria rather than the first line of defense."

Donor agencies against DDT usage

At the moment, the African continent is largely dependent on donor agencies for most of her programmes, including malaria control. As a result of this, there are fears that the decision to use DDT may witness some challenges.

It has been alleged that donor governments and agencies shy from funding DDT spraying, or make aid contingent upon not using DDT.

According to a report in the British Medical Journal, use of DDT in Mozambique "was stopped several decades ago, because 80 percent of the country's health budget came from donor funds, and donors refused to allow the use of DDT."

Before now, many countries had been under pressure from international health and environment agencies to give up DDT or face losing aid grants. Belize and Bolivia

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admitted to have given in to pressure on this issue from United States Agency for International Development, USAID.

The USAID has been the focus of much criticism. But the agency is currently funding the use of DDT in some African countries, though it did not in the past.

The Agency's website states that "USAID has never had a 'policy' as such either 'for' or 'against' DDT for IRS. The real change in the past two years (2006/07) has been a new interest and emphasis on the use of IRS in general - with DDT or any other insecticide - as an effective malaria prevention strategy in tropical Africa."

The website further explains that in many cases, alternative malaria control measures were judged to be more cost-effective that DDT spraying, and so were funded instead.

The way forward
A WHO study released in January 2008 found that mass distribution of insecticide-treated mosquito nets and artesiminin-based drugs cut malaria deaths in half in Rwanda and Ethiopia - two countries with high malaria burdens. DDT, the study states, did not play an important role in mortality reduction in these countries.

Vietnam as well has enjoyed declining malaria cases and a 97 percent mortality reduction after switching in 1991 from a poorly funded DDT-based campaign, to a program based on prompt treatment, bed nets, and pyrethroid group insecticides.

A review of 14 studies on the subject in sub-Saharan Africa, covering insecticide-treated nets, residual spraying, chemoprophylaxis for children, chemophrophylaxis or intermittent treatment for pregnant women, a hypothetical vaccine, and changing front-line drug treatment, found decision making limited by the gross lack of information on the costs and effects of many interventions, the very small number of cost-effectiveness analyses available, the lack of evidence on the costs and effects of packages of measures, and the problems in generalizing or comparing studies that relate to specific settings and use different methodologies and outcome measures. The two cost-effectiveness estimates of DDT residual spraying examined were not found to provide an accurate estimate of the cost-effectiveness of DDT spraying; furthermore, the resulting estimates may not be good predictors of cost-effectiveness in current programs.

However, a study in Thailand found the cost per malaria case prevented of DDT spraying ($1.87 US) to be 21 percent greater than the cost per case prevented of lambda-cyhalothrin-treated nets ($1.54 US). Thus, casting some doubt on the unexamined assumption that DDT was the most cost-effective measure to use in all cases. The director of Mexico's malaria control program found similar results, declaring that it is 25 percent cheaper for Mexico to spray a house with synthetic pyrethroids than with DDT. However, another study in South Africa found generally lower costs for DDT spraying than for nets.

A comparison of four successful programs against malaria in Brazil, India, Eritrea, and Vietnam does not endorse any single strategy but instead states, "Common success factors included conducive country conditions, a targeted technical approach using a package of effective tools, data-driven decision-making, active leadership at all levels of government, involvement of communities, decentralized implementation and control of finances, skilled technical and managerial capacity at national and sub-national levels, hands-on technical and programmatic support from partner agencies, and sufficient and flexible financing.

http://allafrica.com/stories/201307180429.html?viewall=1

Chlorinated Pesticides

What are Chlorinated Pesticides
Chlorinated Pesticides are nerve agents used in agriculture as pesticides, around homes as termiticides, and in grains as fungicides. These chemicals were designed to attack the nervous system of pests which leads to overstimulation of the nerves and eventually death. The most well known chlorinated pesticide is DDT. Most chlorinated pesticides have been banned for use in the United States since the 1980s. However, some of these chemicals are still in use in other parts of the world, and as fat-soluble toxins, they are persistent in the environment and the fatty tissue of animals and humans.

A list of some chlorinated pesticides includes:

- DDT
- DDE
- Dieldrin
- Heptachlor Epoxide
- Hexachlorobenzene
- Mirex
- Oxychlordane
- Trans-nonachlor

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Human exposure occurs mainly through our diet, primarily from high fat foods such as, meat, poultry, dairy products, and fish, and leafy and root vegetables from agricultural run-off. Other sources of exposure are from dust and soil that were contaminated with these pesticides and termiticides.

Chlorinated pesticides are fat-soluble toxins, which mean they are stored in our body fat, and also in the fat of the animals we consume. Since these toxins bioaccumulate, we pass them on to the next generation.

Acute toxicity from chlorinated pesticides is rarely seen since they have been banned; however, their persistence in the environment and our bodies can cause a variety of health problems that begin slowly. The effects of these compounds are most often seen in the neurological, immunological, and endocrinological systems, although they can also affect the cardiovascular, respiratory, gastrointestinal, and other systems in the body.

Exposure can result in adverse health effects such as:

- Increased asthma and allergies
- Parkinsonism
- Chronic fatigue
- Type II Diabetes
- Higher risk of certain cancers
- Fertility and reproductive issues
- Cognitive disorders
- Thyroid issues
- Risk of atherosclerosis
- Obesity
- Autoimmune disease

**Items Containing Chlorinated Pesticides**

**Vegetables**
Vegetables, such as spinach, collard greens, summer squash, Hubbard squash, and cucumbers may be contain chlorinated pesticides due to nutrient absorption from contaminated soil. It is recommended to buy organic, or choose from the "Dirty Dozen" and "Clean Fifteen" lists provided by Environmental Working Group (www.ewg.org).

**Termiticides**
Termiticides are used in and around homes and other buildings. Exposure occurs through inhaling contaminated dust through furnace and air ducts and soil particles that are tracked indoors on our shoes.

**Meat**
Chlorinated pesticides are stored in fatty tissues, and when we consume fatty meats, we are also consuming these toxins. Animals are exposed to pesticides in their natural environment due to groundwater contamination and bioaccumulation. It is recommended to limit fatty meats in the diet to lower chlorinated pesticide exposure.

**Dairy**
Due to chlorinated pesticides being stored in fatty tissues, dairy products also contain these toxins. Animals are exposed to these pesticides in their natural environment due to groundwater contamination and bioaccumulation.

**Fish**
A number of fresh water fish advisories have been posted in certain US lakes and rivers because of DDT and PCB contamination of trout and other fish.

**Fruit**
Fruit may be contaminated with pesticides that are used either directly on them, or by chemical residues that attach to the fruit via dust particles in the environment. It is recommended to buy organic, or choose from the "Dirty Dozen" and "Clean Fifteen" lists provided by Environmental Working Group (www.ewg.org).

http://www.everydayexposures.com/toxins/chlorinated-pesticides

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**Persistent Organic Pollutants**

*Toxic, Persistent, and Pervasive*

**What are POPs?**
Persistent Organic Pollutants (POPs) are toxic substances composed of organic (carbon-based) chemical compounds and mixtures. They include industrial chemicals like PCBs and pesticides like DDT.

They are primarily products and by-products from industrial processes, chemical manufacturing and resulting wastes. The existence of POPs is relatively recent, dating to the boom in industrial production after World War II.

**Why are POPs a threat?**
Today, POPs are found almost everywhere - in our food, soil, air and water. Wildlife and humans around the world carry amounts of POPs in their bodies that are at or near levels that can cause injury.

POPs pose a particular hazard because of four characteristics: they are toxic; they are persistent, resisting normal processes that break down contaminants; they

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Continued from page 52 – Persistent Organic Pollutants

accumulate in the body fat of people, marine mammals, and other animals and are passed from mother to fetus; and they can travel great distances on wind and water currents.

Even small quantities of POPs can wreak havoc in human and animal tissue, causing nervous system damage, diseases of the immune system, reproductive and developmental disorders, and cancers.

Of the numerous POPs that are prevalent in our environment, 12 of the most persistent, bioaccumulative chemicals have been identified for priority action. These 12 POPs are targeted in a new international treaty. The Stockholm Convention on Persistent Organic Pollutants will phase out and eliminate the production and use of those chemicals, as well as new ones that would be added once the treaty is in force.

The 12 targeted POPs include eight pesticides (aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, and toxaphene), two types of industrial chemicals (polychlorinated biphenyls or PCBs and hexachlorobenzene), and two chemical families of unintended by-products of the manufacture, use, and/or combustion of chlorine and chlorine-containing materials (dioxins and furans).

All 12 targeted POPs are also endocrine disruptors, chemicals that can interfere with the body’s own hormones. Endocrine disrupting chemicals can be hazardous at extremely low doses and pose a particular danger to those exposed in the womb. During prenatal life, endocrine disruptors can alter development and undermine the ability to learn, to fight disease, and to reproduce.

http://wwf.panda.org/about_our_earth/teacher_resources/web_fieldtrips/toxics/our_chemical_world/pops/

Organic Pesticides: Not an Oxymoron

By Maureen Langlois

June 17, 2011

It may seem counterintuitive, but foods that are grown to organic standards can contain commercially manufactured pesticides.

A U.S. Department of Agriculture survey of produce that found nearly 20 percent of organic lettuce tested positive for pesticide residues piqued our interest. Lots of the lettuce contained quite a bit of spinosad, a pesticide marketed by Dow Chemical under the brand name Entrust.

So we called, Jeff Gillman, a professor of nursery management at the University of Minnesota who has written about organic practices for lay readers. Right off the bat he told us:

When people are buying organic food, they often make the incorrect assumption that there are no pesticides. It's true that organic production often uses fewer dangerous chemicals, but certain pesticides are allowed.

It turns out that a key factor in chemicals being cleared for use on organic crops is whether they occur naturally. Spinosad, for example, comes from the soil bacterium Saccharopolyspora spinosa. It can fatally scramble the nervous systems of insects. It's also poisonous to mollusks.

The USDA maintains an official list of substances that can and can't be used for organic farming. Other potent natural extracts that have been approved for use as pesticides include pyrethrin, derived from chrysanthemums, and azadirachtin, from the Asian neem tree, which was also detected on some samples of organic lettuce.

All three of these substances are considered slightly toxic by the EPA.

Synthetic compounds can also make it onto the list as pesticides, if they are relatively nontoxic combinations that include minerals or natural elements, such as copper or sulfur. But some naturally occurring substances, such as nicotine and arsenic are off limits.

Are naturally derived pesticides less toxic than synthetic ones? The answer depends a lot on the dosage, says Gillman. "To control fire blight on the same acre of land," he explains, "I could use a tiny amount of a potent synthetic that has proved safe over the last 50 years, or a much larger amount of an organic pesticide." He demurs on saying which is better, saying, "I want people to know that there are definitely tradeoffs."

In the USDA tests, there was ten times as much spinosad on organic lettuce than was found on conventionally cultivated fruits and vegetables.

Gillman wasn't alarmed by the spinosad finding:

It's a relatively new chemistry, relatively safe, and extremely effective against some pests. Now, if I heard about high levels of copper being detected, I'd be more scared than for this stuff.

Copper compounds are used to fight fungal and bacterial diseases in plants. Copper isn't very toxic to humans, he says, but it can accumulate in the soil and eventually

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become poisonous to plants and even worms at high concentrations.

The seeming contradiction between organic labeling and potentially harmful pesticide practices may lie in the relative leniency of the USDA organic guidelines, Gillman says. Various organic certification agencies, such as the Oregon Tilth, have tighter rules. (Check out this [roundup](http://www.npr.org/blogs/health/2011/06/18/137249264/organic-pesticides-not-an-oxymoron) of acceptable and forbidden pesticides.)

Gillman says just because an organic farmer used some authorized chemicals is no reason to shun the food. But it's important for consumers to know what's going on. For him, the answer to the ambiguity around organic labeling is to go local. "I go to the farmers market and talk to the growers to see who is serious about reducing pesticide use," he says. "I'd rather buy food from someone who used Roundup once than someone who uses organic pesticides all the time."


Exposure to Pesticides in Food, Air and Water Increases Risk of Type 2 Diabetes, Study Finds

Feb. 5, 2013 — A study led by the University of Granada reveals that there is a direct relationship between the presence of Persistent Organic Pollutants in the body and the development of type 2 diabetes, regardless of the patient's age, gender or body mass index.

A study conducted at the University of Granada has revealed that there is a direct relationship between exposure to pesticides (Persistent Organic Pollutants, CPOs [POPs]) in food, air and water and prevalence of type 2 diabetes in adults, regardless of age, gender and body mass index. These substances tend to concentrate in body fat, and they might be one of the reasons why obese people are more likely to develop diabetes, since the more fat the higher the COP [POP] concentrations in the body.

In a paper recently published in the journal Environmental Research, researchers demonstrate that people with higher concentrations of DDE -the main metabolite in the pesticide DDT- are four times more likely to develop type 2 diabetes than other people.

In addition, the risk of type 2 diabetes is also associated with exposure to β-HCH (beta-Hexachlorocyclohexane), which is present in the formula of the pesticide Lindano.

A Study with 386 Subjects

To carry out this study, the researchers analyzed the concentrations of a specific group of CPOs [POPs] in the adipose tissue of 386 adult subjects assisted at San Cecilio hospital, Granada, and Santa Ana hospital, Motril, Spain. According to the University of Granada and San Cecilio researcher, Juan Pedro Arrebola, "human adipose tissue (commonly known as "fat") acts as an energy reservoir and has an important metabolic function. However, adipose tissue can store potentially harmful substances, such as persistent organic pollutants (COPs)[POPs]."

This makes CPOs [POPs] concentrations a useful marker of a subject's exposure to CPOs [POPs]. COPs [POPs] are a group of chemicals with diverse characteristics which are present in pesticides, industrial waste and building materials. These compounds penetrate the body mainly through food, but also through air or the skin.

According to professor Arrebola, "the mechanism of action by which COPs [POPs] increases the risk of diabetes is still unknown. However, some researchers have suggested that COPs [POPs] might cause an immunological response when they penetrate estrogen receptors in tissues associated with the metabolism of sugars."

The prevalence of diabetes in the world has significantly increased in the last decades. It is estimated that by 2030, 4.4% of the world population have this metabolic disorder. This will have a severe impact on public health programs, since it is highly resource-consuming. The factors causing such increase in the prevalence of diabetes are not still clearly understood.

This research study was conducted by researchers at San Cecilio University Hospital, Granada, the University of Granada and the Andalusian School of Public Health, Santa Ana hospital, Motril, and the Hospital del Mar d'Investigacions Médiques, Barcelona. According to the authors of the study "we are an example of clinical research focused on common diseases with a high impact on health."

Journal Reference:

http://www.sciencedaily.com/releases/2013/02/130205101415.htm
In 2012, Professor Seralini of the University of Caen in France led a team that carried out research into the health impacts on rats fed GMOs (genetically modified organisms) (1). The two-year long study concluded that rats fed GMOs experienced serious health problems compared to those fed non GM food. Now comes a new major peer-reviewed study that has appeared in another respected journal. This study throws into question the claim often forwarded by the biotech sector that GMO technology increases production and is beneficial to agriculture.

Researchers at the University of Canterbury in the UK have found that the GM strategy used in North American staple crop production is limiting yields and increasing pesticide use compared to non-GM farming in Western Europe. Led by Professor Jack Heinemann, the study’s findings have been published in the June edition of the International Journal of Agricultural Sustainability (2). The research analysed data on agricultural productivity in North America and Western Europe over the last 50 years.

Heinemann states his team found that the combination of non-GM seed and management practices used by Western Europe is increasing corn yields faster than the use of the GM-led package chosen by the US. The research showed rapeseed (canola) yields increasing faster in Europe without GM than in the GM-led package chosen by Canada. What is more, the study finds that it is decreasing chemical herbicide and achieving even larger declines in insecticide use without sacrificing yield gains, while chemical herbicide use in the US has increased with GM seed.

According to Heinemann, Europe has learned to grow more food per hectare and use fewer chemicals in the process. On the other hand, the US choices in biotechnology are causing it to fall behind Europe in productivity and sustainability.

The Heinemann team’s report notes that incentives in North America are leading to a reliance on GM seeds and management practices that are inferior to those being adopted under the incentive systems in Europe. This is also affecting non GM crops. US yield in non-GM wheat is falling further behind Europe, “demonstrating that American choices in biotechnology penalise both GM and non-GM crop types relative to Europe,” according to Professor Heinemann.

He goes on to state that the decrease in annual variation in yield suggests that Europe has a superior combination of seed and crop management technology and is better suited to withstand weather variations. This is important because annual variations cause price speculations that can drive hundreds of millions of people into food poverty.

The report also highlights some grave concerns about the impact of modern agriculture per se in terms of the general move towards depleted genetic
diversity and the consequently potential catastrophic risk to staple food crops. Of the nearly 10,000 wheat varieties in use in China in 1949, only 1,000 remained in the 1970s. In the US, 95 percent of the cabbage, 91 percent of the field maize, 94 percent of the pea and 81 percent of the tomato varieties cultivated in the last century have been lost. GMOs and the control of seeds through patents have restricted farmer choice and prevented seed saving. This has exacerbated this problem.

Heinemann concludes that we need a diversity of practices for growing and making food that GM does not support. We also need systems that are useful, not just profit-making biotechnologies, and which provide a resilient supply to feed the world well.

Despite the evidence, governments capitulate

Given the mounting evidence that questions the efficacy and safety of GMOs (3,4,5,6,7), it raises the issue why certain governments are siding with the biotech sector to allow GMOs to be made available on commercial markets. It is simply not the case that country after country is accepting GMOs on the basis of scientific evidence, as scientists-cum-lobbyists for the GM sector often state (8). If scientific evidence were to be determining factor, few if any countries would have sanctioned GMOs.

Part of the answer lies in the fact that the powerful US biotech sector continues to forward its agenda that GMOs are a frontier technology that will save humanity from famine and hunger. This is despite evidence that most of the world’s hunger is the product of profit-eering industrial chemical agriculture and the global structuring of food production and distribution under the banner of ‘free trade’ and ‘structural adjustment’ (9,10), or as many of us know it brow beating and structural dependency.

Yet, the mantra of GM as the saviour of humanity persists courtesy of the GM sector’s puppet politicians and regulatory bodies (11). The US is pushing for lop-sided bilateral trade agreements with other countries not only to generally tie economies into US economic hegemony in an attempt to boost its ailing economy and flagging currency, but more specifically to get nations to ‘accept’ GMOs. Through behind-closed-door deals (12,13) coercion (14) or the hijack of regulatory bodies (15), there has been some success, and many think it could be just a matter of time before other countries, not least India, capitulate to allow GM food crops onto the commercial market.

In fact, regardless of any legal statute, it may be and probably is already happening in India, not least via contamination (16). However, if contamination by means of illegal planting and open field ‘testing’ fails to get GMOs on to the commercial market via the back door, the GM sector is attempting to cover all angles. Immediately after a moratorium on BT Brinjal was announced in 2010, a Biotechnology Regulatory Authority of India (BRAI) Bill suddenly emerged. The BRAI Bill could not be passed in 2010 and 2011 because of objections, but it has surfaced again as a 2013 Bill. Environmentalist Vandana Shiva argues that it not so much constitutes a Biotechnology Regulation Act, but a Biotechnology Deregulation Act, designed to dismantle the existing bio-safety regulation and give the green-light to the GM sector to press ahead with its agenda in the country.

By highlighting the GM sector interests behind the proposed legislation, Shiva says that the goal is to give the sector’s corporations immunity by freeing them of courts and democratic control under India’s federal structure. For those who follow such developments in India, it doesn’t take a great deal of imagination to appreciate that the future of Indian agriculture is in the wrong hands. Certain key scientists and top politicians have already been ideologically (or otherwise) ‘bought and paid for’ by proponents of the ‘Green Revolution’ and more recently the GM sector (7).

On a global level, with reports of wheat (17), rice (18) and maize (19) having been widely contaminated with GMOs, there seems to be a conscious ploy to contaminate so much of the world’s crops so that eventually GMOs take over regardless and render the pro/anti GM debate almost academic (20).

It seems that secretive trade deals, the hijack of official bodies designed to ensure the ‘public interest’ and bullying or intimidation are not enough. Contamination strategies are but one more way of achieving through closed and non-transparent methods what could not be possible by transparent and democratic means – simply because hundreds of millions of people do not want GMOs.

A generation down the line (or much sooner), will we looking at the health and environmental consequences of GMOs in the same way we now regard the impacts of the original ‘Green Revolution’?

“There are very good reasons why we have never introduced a Green Revolution into Africa, namely because there is broad consensus that the Green Revolution in India has been a failure, with Indian farmers in debt, bound to paying high costs for seed and pesticides,
Genetic Engineering: The Global Food and Agricultural Crisis

committing suicide at much higher rates, and resulting in a depleted water table and a poisoned environment, and by extension, higher rates of cancer.” Paula Crossfield, food policy writer/activist (21).

We don’t have to take Paula Crossfield’s word for it, though. Punjab was the ‘Green Revolution’s’ original poster boy, but is fast becoming transformed from a food bowl to a cancer epicenter and now reels under an agrarian crisis marked by discontent, debt, water shortages, contaminated water, diseased soils and pest infested cops (22,23,24).

In the meantime, big ‘ag’ in collusion with big pharma will continue to control our food and define our healthcare by pushing their highly profitable ‘miracle solutions’ for the health and environmental problems which they conspired to create in the first place. It is all part of the wider corporate-elite agenda to colonise and control every facet of human existence.

Notes

1) http://www.sciencedirect.com/science/article/pii/S0278691512005637
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GM Crops: Campaigners in Ghana accuse US of Pushing Modified Food

From farmers to MPs, debate over seed ownership and the role of foreign influences on agriculture is causing divisions in Ghana

By Afua Hirsch

24 July 2013
Guardian.co.Uk

The US embassy in Accra held a roundtable on biotechnology this month. The discussion, designed to promote candid dialogue between biotechnology supporters and sceptics, was attended by experts and campaign groups on both sides of the GM foods debate.

But one Ghanaian campaign group refused the invitation. "Our call for a moratorium on GM foods was met with an invitation to a closed-door discussion," said Duke Tagoe, of Food Sovereignty Ghana, which campaigns for greater transparency about GM foods.

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“We are deeply worried about what seems like an imposition of genetically modified foods on the good people of Ghana without any meaningful public discourse, compounded by attempts to stifle any opposition.”

Food Sovereignty Ghana and other domestic organisations accuse the US and other foreign donors of promoting GM foods to west African countries, and tying aid to implementation.

According to a leaked cable, the US government was heavily involved in drafting Ghana's 2011 Biosafety Act, which provided a framework for the introduction of GM foods. The US aid department provided technical assistance and some funding.

The cable said biotech products were being sold in Ghana and GM seeds from neighbouring countries were likely to have migrated over its borders. US companies have begun requesting permission to conduct trials.

The US embassy in Accra declined to respond to a request by the Guardian to comment on its stance on GM food in Ghana, but claims about the arrival of GM are supported by public officials.

"Trials are being conducted, but there isn't any framework in place," said Kweku Dadzie, from Food Sovereignty Ghana. "We are calling for a ban on the importation, cultivation, consumption and sale of genetically modified foods and crops, until the people of Ghana are satisfied that such an important and irrevocable decision is a sound and proper one to make."

Dadzie points to a lack of public debate surrounding the passing of the Biosafety Act. Maxwell Kofi Jumah, MP for Asokwa, recently admitted on local radio that ministers lacked understanding of the issues.

Many opponents of GM crops have pointed to the role of multinational companies that sell GM "hybrid" seeds that do not self-pollinate, compelling farmers to buy new seeds from the same companies each year, as well as their pesticides and herbicides.

"GM foods are used in agriculture. This is something you cannot wish away because it has come and it is in practice," said John Odame Darkwa, acting chief executive officer of Ghana's Food and Drugs Authority (FDA). "We ensure that any food imported into the country is safe."

But campaigners say trials of GM foods, which the FDA admits have been carried out in Ghana, are a violation of the law, which states trials require the written approval of a new body, the National Biosafety Authority. The problem, they say, is that this authority does not exist yet.

"But at the same time, the quality of seeds that pollinate themselves is often not that great. It can be difficult for farmers to select the best seeds. The job of seed companies is to select seeds that will have a bigger yields. The best hybrid rice, for example, produce about 20% better yields than the best self-pollinating seeds."

Some say that, instead of looking at yield increases through GM, the focus should be on improving access to markets for the crops that are already being grown by greater investment in extension services and low-technology improvements in farming.

"There is huge potential to increase yields using low-cost and existing technologies," said Kanayo Nwanze, president of the International Fund for Agricultural Development, speaking at the Africa Agricultural Science Week in Accra last week. "In Africa, only about 6% of the total cultivated land is irrigated … It is estimated that irrigation alone could increase output by up to 50% in Africa."
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"Small increases in fertiliser use in sub-Saharan Africa can produce dramatic improvements in yields. Post-harvest grain losses in sub-Saharan Africa average $4bn every year. This is food that could meet the nutritional needs of around 48 million people."

Rijssberman said farmers needed better seeds, but also required better access to inputs, access to markets, farming systems and livelihood strategies. "These things would go a long way to improving yields and incomes in a country like Ghana," he added.

http://www.guardian.co.uk/global-development/2013/jul/24/gm-crops-ghana-us-genetically-modified-food

Water in Pesticide Spray Likely Source of Cyclospora in Outbreak

February 10, 1997

FOOD CHEMICAL NEWS

A field investigation in Guatemala conducted by the Centers for Disease Control and Prevention (CDC) has indicated that the water used in pesticide solutions is the most likely source of the parasite Cyclospora cayetanensis that caused a multistate outbreak of foodborne illness last summer.

Pesticides are mixed with water, then applied to raspberry plants by spraying the mixture onto the soil or directly onto the plant. The water used for mixing may come from wells, reservoirs, and in a few cases, rivers or springs. In investigating the ten farms implicated in the outbreak, it was found that two farms obtained water from a river and underground spring and three others used water stored in reservoirs, some of which were open and could easily have become contaminated. Filters used for the water were not small enough to filter out Cyclospora oocysts.

The investigation looked at sources of water because other investigations of Cyclospora cayetanensis have reported water as the mode of transmission. Though CDC investigators concluded that water sprayed on raspberries during pesticide application is the most likely mode of transmission of the parasite, they admitted that other possibilities cannot be completely ruled out.

The CDC report made several recommendations for ways to prevent similar outbreaks in the future. One such recommendation advised that any water used to mix pesticides should meet the standards for potable water as defined by World Health Organization guidelines.

The report also urged continued cooperation between CDC and the Guatemalan exporters' association, GEXPRONT, to help in preventing or tracking any future outbreaks.

http://www.ext.colostate.edu/safefood/newsltr/v1n4s03.html

Parasite Sickens 250 in Midwest; Fresh Produce Suspected

By JoNel Aleccia

July 22, 2013

NBC News

Infections caused by the rare parasite cyclospora have sickened about 250 people in several U.S. states, federal health officials said Monday. Here, four round oocysts were found in a fresh sample of human stool.

More than 250 people have been sickened, mostly in the Midwest, by a rare parasite that may have contaminated fresh produce shipped across state lines, said federal health officials, who’ve stepped in to help coordinate the growing outbreak.

At least 118 cases of cyclospora infection have been reported in Iowa, another 65 in Texas and 68 in Nebraska, state officials said. Four more cases also have been reported in Wisconsin and one each in Illinois and Kansas, although the Illinois case may have originated in Iowa.

At least eight people have been hospitalized, the Centers for Disease Control and Prevention reported Monday.

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Continued from page 59 - Parasite Sickens 250 in Midwest; Fresh Produce Suspected

So far, there’s no clear source for the illnesses, which were reported from mid-June through July, said Dr. Barbara Herwaldt, a medical epidemiologist with the CDC’s division of parasitic diseases and malaria centers.

“Nothing has been implicated yet in a formal sense,” Herwaldt said. “No food item has been identified as the source of the outbreak.”

But officials in Nebraska and other states suggest that fresh vegetables may be the source, based on interviews with people who got sick. Tainted produce could have been shipped across state lines, accounting for the illnesses in multiple states, Herwaldt said. More than one food source could be behind the outbreak and contaminated water used in growing practices could be a culprit.

Cyclospora is a microscopic protozoan parasite excreted in human stool. Protozoa are tiny, one-celled animals that breathe, move and reproduce.

Symptoms of infection can include weeks or months of watery diarrhea -- but the infection is treatable with common antibiotics, Herwaldt said. She encouraged people who have unexplained stomach troubles to seek medical help and to ask whether a test for cyclospora infection might be necessary. Such tests are not routinely performed, and have to be requested.

Other symptoms can include fatigue, loss of appetite, weight loss, bloating, intestinal gas, stomach cramps, nausea, vomiting, muscle aches and low-grade fever.

There’s no known natural source in the U.S. of cyclospora. That raises the possibility that imported produce could be behind the outbreak, Herwaldt added.

Indeed, raspberries imported from Guatemala were responsible for a 1996 outbreak that sickened 1,465 people in the U.S. and Canada, and also for a 1997 outbreak that made more than 1,000 people ill, CDC records show. Other foods considered potential culprits in other outbreaks include fresh herbs and lettuce.

Cyclospora infections must be reported in 39 states, plus New York City and Washington, D.C., Herwaldt said. CDC encourages other states to report infections as well, both in order to help treat individual people and to help stop the future spread of the parasite.

Consumers should wash their hands well when handling fresh produce and scrub it well, if possible. Refrigeration seems to slow the parasite’s ability to infect people, Herwaldt said.

It’s possible that the contaminated produce has made its way through the food supply in the past month, but it’s still too soon to tell, she said.

“What we don’t know yet is whether the transmission or spread of the parasite is ongoing,” she said.

http://www.nbcnews.com/health/parasite-sickens-250-midwest-fresh-produce-suspected-6C10709186

What is the Connection between Pesticides and Breast Cancer?

A growing body of scientific evidence suggests that exposures to toxic chemicals, including pesticides, in the environment are contributing to high breast cancer rates. Pesticides used in and around the home and in agriculture are used to control pests like weeds (herbicides), fungus (fungicides), insects including fleas and ticks on pets (insecticides) and rodents (rodenticides).

Pesticides are just one of many daily toxic exposures. We can be exposed to unsafe chemicals through the use of pesticides in our yards, on our pets, in public parks or on the food we eat as well as from certain plastics, cosmetics and pharmaceuticals.

Even though some pesticides have been banned, they remain in the body and the environment for decades.

DDT, perhaps the most studied pesticide, was banned in the U.S. in 1973 but can still be found in household dust samples and in the body fat of humans and animals and in human breast milk and placenta. Not all pesticides linked to breast cancer act the same.

Some pesticides are breast carcinogens. Carcinogenic chemicals are found widely in our environment and cause direct damage to breast cell DNA or change the cell’s ability to respond to internal or external challenges.

Ten of the 216 animal mammary carcinogens listed by Silent Spring Institute in 2007 are pesticides.

Other pesticides disrupt hormones in the body. Many pesticides are endocrine disruptors. Endocrine disruptors are chemicals that disturb or mimic normal biological processes like the actions of hormones including androgens, estrogens and thyroid hormone. Chemicals that mimic estrogen are of particular concern because exposure over time to natural estrogen—or synthetic chemicals that act like estrogen—increases the risk of breast cancer.

Continued on page 61
Continued from page 60 - See Table for a list of pesticides linked to breast cancer, whether they are carcinogens or endocrine disruptors and common sources of exposure.

<table>
<thead>
<tr>
<th>Pesticide</th>
<th>Carcinogenic</th>
<th>Disrupts Hormones</th>
<th>Source of Exposure/Scope of Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Animal Mammary Gland Carcinogen*</td>
<td>Human Carcinogenic Risk Classification†</td>
<td>Disrupts Endocrine System/Estrogenic‡</td>
</tr>
<tr>
<td>1,2-Dibromo-3-chloropropane</td>
<td>√</td>
<td>IARC Posible NTP Reasonably anticipated</td>
<td>Pesticide, air pollution, ingestion of previously contaminated food and water, banned as soil fumigant in 1985</td>
</tr>
<tr>
<td>2,4-Dichlorophenoxy acetic acid</td>
<td></td>
<td></td>
<td>Pesticide: herbicide</td>
</tr>
<tr>
<td>Atrazine (a Triazine Herbicide)</td>
<td>√</td>
<td>IARC Not Classifiable</td>
<td>Pesticide: herbicide, air pollutant, found widely in water bodies, exposure through ingestion of food or water, banned in European Union in 2005, 75 million pounds used annually in U.S. mainly on corn and sorghum</td>
</tr>
<tr>
<td>Captafol</td>
<td>√</td>
<td>IARC Probable</td>
<td>Pesticide: fungicide, not currently registered for use in U.S.</td>
</tr>
<tr>
<td>Chlordane</td>
<td>√</td>
<td></td>
<td>Pesticide: insecticide (ticks and mites), veterinary pharmaceutical, air pollutant, use as insecticide has been banned, persists in meat, fish, and found in household dust</td>
</tr>
<tr>
<td>Chloropyrifox</td>
<td></td>
<td></td>
<td>Pesticide: insecticide (ticks and mites)</td>
</tr>
<tr>
<td>Clonitralid</td>
<td>√</td>
<td></td>
<td>Pesticide, exposure through dermal contact or ingestion of water treated with clonitralid (for water snail and sea lamprey control) or contaminated fish</td>
</tr>
<tr>
<td>Cypermethrin</td>
<td></td>
<td></td>
<td>Pesticide: insecticide</td>
</tr>
<tr>
<td>DDT (Dichlorodiphenyl-trichloroethane)</td>
<td>NTP Reasonably anticipated</td>
<td></td>
<td>Pesticide: contact insecticide, banned in many countries, used for malaria control in others, DDT and metabolite DDE still found in body fat of humans and animals though banned in U.S. in 1973</td>
</tr>
<tr>
<td>Dichlorvos</td>
<td>√</td>
<td>IARC Possible</td>
<td>Pesticide, air pollutant, inhalation or air and dermal contact with no-pest strips, sprays or flea collars, ingestion of food prepared where dichlorvos has been used</td>
</tr>
<tr>
<td>Dieldrin, Aldrin, Endrin (-drin pesticides)</td>
<td></td>
<td></td>
<td>Pesticide: insecticide, 1950s to 1970s dieldrin and aldrin used on corn and cotton, 1987 both were banned, still persist in environment</td>
</tr>
<tr>
<td>Fenvalerate</td>
<td>√</td>
<td>IARC Not Classifiable</td>
<td>Pesticide, landscaping/yard products, pet care products</td>
</tr>
<tr>
<td>Heptachlor</td>
<td></td>
<td>IARC Possible</td>
<td>Pesticide: insecticide, used for termite control through 1980s in U.S., agricultural use continued until 1993 (especially on pineapple), affects liver's processing of estrogen</td>
</tr>
<tr>
<td>Lindane</td>
<td></td>
<td>NTP Reasonably anticipated</td>
<td>Pesticide: insecticide</td>
</tr>
<tr>
<td>Malathion</td>
<td>√</td>
<td></td>
<td>Pesticide: insecticide</td>
</tr>
<tr>
<td>Methoxychlor</td>
<td></td>
<td></td>
<td>Pesticide: insecticide, veterinary pharmaceutical</td>
</tr>
</tbody>
</table>
**What can we do about pesticides?**

Support organic agriculture at home and in the schools to reduce exposure to hormonally-active pesticide residues and find alternatives to pesticide use in your daily life.

Visit [www.panna.org](http://www.panna.org) for more information.

Support bans of the cosmetic – purely aesthetic – use of pesticides, meaning, where the weed or pest poses no danger to human health, the environment or property. The cities of San Francisco and Oakland in California have banned the use of pesticides in their parks for years and Canadians are actively pushing for bans in municipalities. What about your town?

Pesticides may disrupt the endocrine systems of children during critical stages of development and contribute to later-life breast cancer risk or to the early onset of puberty, also a risk factor for breast cancer. Visit [www.breastcancerfund.org/pubertyreport](http://www.breastcancerfund.org/pubertyreport) to learn more.

Biological cause of Black Women's Deadly Cancer

September 6, 2007

A new study gives a possible explanation for why breast cancer is more deadly in black women: They are more likely to have tumors that do not respond to the hormone-based treatments that help many others with the disease.

The study is the largest yet to link a biological factor to the racial disparity, which also has been blamed on black women getting fewer mammograms and less aggressive treatment.

“This puts biology more to the forefront,” said Dr. Julie Gralow, a cancer specialist at the University of Washington School of Medicine familiar with the work. “It’s not just access to care, access to treatment and other factors that have been implicated in the past.”

The study was led by Dr. M. Catherine Lee of the University of Michigan Comprehensive Cancer Center and is to be presented at a conference starting Friday in San Francisco, organized by the American Society of Clinical Oncology and other cancer groups.

Breast cancer is the most common cancer in American women. An estimated 178,480 new cases and 40,460 deaths from it are expected in the United States this year.

More likely to die
Blacks are less likely than whites to develop breast cancer but are more likely to die from it, doctors have long known. Blacks also are diagnosed at younger ages and at later stages of disease.

Researchers for the first time used the National Cancer Data Base, a tumor registry maintained by the American College of Surgeons, to explore these issues, using more than 170,000 cases diagnosed in 1998. Ten percent were in black women.

The study focused on the 95,500 women whose cancers were invasive rather than still confined to a milk duct. About 39 percent of such tumors in black women were estrogen receptor-negative, or ER-negative, compared with 22 percent of those in white women.

Estrogen helps tumors grow. Drugs that block this hormone, like tamoxifen and a newer class of medications called aromatase inhibitors, work against these cancers.

ER-negative tumors are resistant to such therapies and harder to treat. Other tools like chemotherapy, radiation and targeted biological drugs then become more important for such women, and doctors should consider this when they evaluate black women with the disease.

In the study, ER-negative tumors were more common in black women at every stage of disease and at all ages.

For example, only 17 percent of early stage tumors in white women were ER-negative, but 31 percent in black women were. Of the most advanced cancers, 31 percent in whites and 46 percent in blacks were ER-negative.

Cancer more advanced when diagnosed
Echoing previous research, the new study found that black women were diagnosed at younger ages — an average of 57 years old versus 62 for white women — and with more advanced disease: Only 29 percent had early stage tumors versus 42 percent of white women. They also had larger tumors and more cell traits that are signs of a poor prognosis.

Smaller studies have suggested biological differences between breast cancer in blacks and whites. Earlier this year, the Carolina Breast Cancer Study found that young black women were more likely to have an aggressive form called the basal-like subtype.

Last fall, two studies by researchers from the University of Texas M. D. Anderson Cancer Center found that black women were more likely to have larger, later-stage tumors and lower survival rates than Hispanic and white women given similar treatments.

But these findings do not mean that differences in screening and health care are not contributing to the trend, especially in certain parts of the country, said Dr. Wendy Woodward, a breast cancer specialist at M.D. Anderson.

“You really have to kind of go at the problem from all angles. If you solve the access problem and women come in and you don’t have an adequate therapy for them, you haven’t taken a step forward,” she said.

Dr. Len Lichtenfeld, deputy chief medical officer of the American Cancer Society, agreed. Racial disparity in breast cancer survival did not appear until the mid-1980s, suggesting that much of it is due to lack of screening mammograms and access to care, he said.


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FEATURED ARTICLES

Uproar over Killing of Rare Birds

By Flavia Lanyero
Daily Monitor, July 25, 2013

Quelea birds fly over a rice field recently at the Kibimba Rice Scheme in Bugiri District. PHOTO BY DAVID AWORI

In Summary
Ministry of Tourism officials say the decision to indiscriminately spray the quelea birds with poison has negative impacts on both the environment and tourism.

Kampala
When the Ministry of Agriculture, Animal Industry and Fisheries was on Monday faced with the challenge of quelea birds eating rice at Kibimba Rice Scheme, their immediate remedy was to kill them by spraying.

This has spurred fury among bird lovers and conservationists who say this was not only a breach of wildlife laws, but also endangering to other animal species not targeted by the spraying.

In an interview with the Daily Monitor, the acting public relations officer, ministry of Tourism, Wildlife and Antiquities, Mr Akankwasah Barirega, said the ministry is worried that other non-target species, especially pollinators like bees and butterflies, could have ended up dying which could pose a threat to future food production.

“While we agree with the need to control the birds from destroying crops and causing losses to farmers, the unilateral action taken to indiscriminately spray poison without due consultation and or conducting any environmental impact assessment is not only in breach of the National Environment Act Cap 153, but also has serious ramifications for environment, tourism and hence national economy,” Mr Barirega said.

1.8 Million Killed
The Ministry of Agriculture in partnership with the Desert Locust Control Organisation of East Africa on Monday carried out a pest control exercise at Kibimba Rice Scheme in Bugiri District, spraying dead about 1.8 million quelea birds that were destroying an estimated 15 tonnes of rice a day.

Section 15 of the Uganda Wildlife Act, Cap 200 requires an environmental impact assessment for any activity likely to have significant impact on any wildlife species or community, and section 96 of the National Environment Act criminalises conducting such activities like aerial spray or introducing new pesticides without conducting an environment impact assessment.

The Ministry of Agriculture did not, however, conduct an environmental Impact assessment before carrying out the aerial spray. Mr Stephen Byantwale, the Principal Agriculture Inspector in the Ministry of Agriculture, said the exercise was aimed at controlling more than 2 million quelea birds that had migrated into the county and were causing destruction.

Mr Acheles Byaruhanga, the executive director of Nature Uganda and a bird’s researcher, said the option of killing birds is an indication of poor planning on the side of the Ministry of Agriculture and that it does not solve the problem.

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Mr Byaruhanga said the quelea birds are a native of Uganda which breed in swampy areas and do not move in huge numbers of millions as agriculture officials claim.

"First these birds’ habitats has been destroyed and they need to look for means of survival. Secondly these birds feed on cultivated crops during breeding seasons therefore the Ministry of Agriculture should advice farmers on when cultivation should be which should not be during the birds’ breeding season to minimise loses,” Mr Byaruhanga said, adding that the poisonous spray could easily find its way into the soil.

Bird haven

Uganda is globally known as the bird haven of Africa and birding is one of the biggest tourism products for the country. According to the Ministry of Tourism, Uganda generates more than $6 million annually from birding tourism alone.

Mr Barirega said other methods like mist trapping, scaring, aerial spray but after careful planning and following an environmental Impact assessment and spraying hot water without using poisonous chemicals could have been deployed.

Honey Bees in Trouble?
Blame Farm Chemicals, Study says

By John Roach

July 25, 2013
NBS News

Honey bees rented to out pollinate crops from apples to watermelons return to their hives with pollen containing an array of agricultural chemicals that make the insects more vulnerable to infection by a lethal parasite, according to a new study.

While other research has shown certain pesticides, including insecticides known as neonicotinoids and others used to fight parasitic mites, can compromise bee health, the new study shines a light on the impact of sprays used to kill fungi and molds.

"Fungicides, which we didn't expect to harm insects, seem to have a sub-lethal effect on bee health," Dennis vanEngelsdorp, an entomologist at the University of Maryland and senior author of the new study, told NBC News.

"And that is important, of course, because there is not a lot of regulation for fungicides when they are being applied to flowering plants … so this suggests that we need to rethink and reevaluate how we write label laws for some fungicides," he added.

The study, published online Wednesday in the journal PLoS One, is the first to analyze the real-world conditions honey bees encounter as they pollinate crops. The analysis revealed which flowering plants were the bees' main pollen sources and what agricultural chemicals were commingled with the pollen.

On average, the pollen samples contained nine different agricultural chemicals, including fungicides, insecticides, herbicides and miticides. Sub-lethal levels of multiple agricultural chemicals were present in every sample. One contained 21 different pesticides.

The most common pesticides were the fungicide chlorothalonil, which is used on apple and other crops, and the insecticide fluvalinate, which is used by beekeepers to control Varroa mites, a honey bee pest that a government backed study released earlier this year fingered as the leading cause of honey bee decline.

"Varroa mites are beekeepers number one problem and so the treating with miticides … is a little bit like chemotherapy; it is bad for the bees, we know it is bad for the bees, but we know that not treating is much worse for the bees," vanEngelsdorp said.

The researchers only found neonicotinoids, which other studies have shown to be toxic to pollinators, in honey bees that were pollinating apples, suggesting the insecticide is just one part of a complex problem.

This chemical-laden pollen was fed to healthy bees, which were then tested for their ability to resist infection with Nosema ceranae, a parasite of adult honey bees that has been linked to the overall problem of honey bee decline.

The biggest surprise, according to the researchers, is that bees fed pollen containing the fungicide chlorothalonil were nearly three times more likely to be infected by Nosema than bees that were not exposed to these chemicals.

"It suggests that we really have to look broadly at pesticides and look at ways of reducing pesticide exposure, including fungicides," vanEngelsdorp said.

The finding jives with earlier studies pointing to interactions between various factors as a cause for
Continued from page 65 – Honey Bees in Trouble?

honey bee decline, noted Olav Rueppell, a biologist and bee expert at the University of North Carolina, Greensboro, who was not involved in the new research.

"But this study is particularly nice because it takes actually the pollen that bees bring into the hive … to compromise honey bee immunity," he told NBC News in an email. "Therefore, many substances are involved and seem to have an effect."

And since the problem of honey bee decline appears multifaceted, added vanEngelsdorp, "the solutions are probably multifaceted."

http://www.nbcnews.com/science/honey-bees-trouble-blame-farm-chemicals-study-says-6C10736740

Nigeria: FG Begins Aerial Spray of Locusts in Bauchi

14 July 2013
The Vanguard

Bauchi — The Federal Government has begun the aerial spray against quelea birds and grasshoppers in 10 local government areas of Bauchi State.

The state Commissioner for Agriculture, Alhaji Tasiu Abubakar, said this at the beginning of the exercise in Bauchi.

He said that the state government had donated 750 litres of pesticides for the exercise.

Abubakar said it would curb the menace of pests and ensure the realisation of mass food production by encouraging peasants to take to farming.

He, however, warned farmers within the affected areas to stay indoors during the period to avoid inhaling the poisonous insecticides.

It gathered that the exercise was being conducted by the Federal Ministry of Agriculture and Rural Development in conjunction with the state government.

The Coordinator, North-East Zonal Office of the ministry, Mr Johnson Waziri, observed that one of the greatest challenges facing agriculture was pest control.

Waziri said the exercise was in line with the government's Agricultural Transformation Agenda toward ensuring sustainable food security.

He said that it would be conducted every morning and evening, adding that the period coincided with the "nesting time for the pests". The coordinator commended the state government for giving top priority to agriculture.

The Chairman, Global Apex Air, the company handling the exercise, Capt. Gbenga Bankole, who conducted dignitaries round the aircraft, said the organisation was using a new technology to do the exercise.

Bauchi, Alkaleri, Kirfi, Misau, Giade, Ningi, Shira, Gamawa, Jama'are and Zaki local government areas are beneficiaries of the exercise. (NAN)

http://allafrica.com/stories/201307150399.html

Tanzania: Herbicide Effects Extend Beyond Plants

By Anne Outwater

13 May 2012
Tanzania Daily News

Column

HERBICIDE tolerant crops, developed through genetic engineering, were supposed to control weeds, and Bt crops were intended to control insect pests.

In fact one of the most potent promises made around genetically engineered crops was that pesticide use would decrease. This is a seductive goal since pesticides are dangerous for human beings and the environment. However, the opposite has happened.

Instead of controlling insect pests and weeds, genetically engineered crops have led to the emergence of insects and weeds resistant to the usual insecticides and herbicides .... A few weeks ago we examined the problem of increased insecticide use; this week we will examine the picture emerging around increasing herbicide use.

The purpose of inserting the gene to make a crop herbicide resistant is so that the crops can then be weeded by using that particular herbicide (in order to decrease the involvement of human labor). The crops themselves become resistant because of the gene that was inserted into them. So even when the herbicide is killing all around it, the crop with the inserted gene will still live.

Monsanto, the company who is believed to own 90% of genetically engineered seeds, has made most of them dependent on the herbicide Roundup, which they also sell. These crops are called Roundup ready. Roundup is the most widely used herbicide in the history of the

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planet. The name of the herbicide used in Roundup is glyphosate. Let's look at glyphosate for a moment.

It is described as a broad-spectrum systemic herbicide. It is a non-selective herbicide that kills grasses, broad-leaved, and woody plants. Nonselective is a warning word here; non-selective means it can kill everything around it. Just by hearing that type of description, we can be alerted that this kind of chemical is working at a very fundamental level.

According to Iowa State University Agronomy Department, glyphosate inhibits a pathway (through the Shikimate pathway enzyme) that is responsible for many things including biosynthesis of amino acids and biosynthesis of many different plant compounds. The chemical is readily absorbed through the foliage of a plant and accumulates in areas of active growth.

Plants cannot metabolize or detoxify the chemical. Glyphosate inhibits protein synthesis. The plants stop growing and slowly degrade due to lack of proteins. The plant ultimately dies from dehydration and desiccation.

According to Dr Robert Kremer, microbiologist with the USDA Agricultural Research Service, who conducted a 15-year study on glyphosate's effects on plants and root microbiology, it also removes important trace minerals, "Glyphosate is a chelator, which will bind with elements such as manganese and calcium, and those sorts of nutrients, and immobilize them... In other words, it will make them unavailable for plant uptake."

A review of the toxicological data on Roundup (Giesy, Solomon, Dombson, 2000) concluded that glyphosate produces functional abnormalities in fetuses and pregnant rats. As well it interferes with testosterone production in mouse cultures, and estrogen biosynthesis in cultures of human placental cells.

There are great dangers to aquatic organisms especially amphibians. A study in 2010 (Paganell, Gnazzo, Acosta, Lpez, and Carrasco) incubated the embryos of African clawed frogs (a species often used in research) with a 1:5000 dilution of a commercial glyphosate solution. They discovered found that glyphosate caused neural defects, and craniofacial malformations;

in addition, the frogs also suffered diminution of body size, alterations in brain morphology, reduction of the eyes, and many neural system abnormalities.

These same horrifying basic abnormalities also occurred in experiments with chicken embryos. There is no reason to think these types of things would not happen to human embryos – that is, babies in the womb. It is ethically difficult to conduct research on such poisons directly on human beings. But in Great Britain and the United States glyphosate incidents are the highest reported of all pesticides. People experience skin irritation and gastrointestinal corrosive effects - mouth, throat.

Kidney and liver impairment are frequent. In human beings Roundup - and its most active ingredient glyphosate - leads to rashes, nausea, headaches, and also to seizures, convulsions, and death. Ingestion of 85 milliliters leads to "significant toxicity" even death in a human being. The United States and China are the leading producers of this broad-spectrum, nonspecific poison.

Imagine... putting something like that out on the market. Imagine again... engineering basic crops so that more of it will be used... It is almost beyond imagining, but there it is.

http://allafrica.com/stories/201205130180.html

South Africa: Developing Guidelines for 'Roundup' in South Africa

By Alan Anderson

23 January 2013

Paul Kojo Mensah, a SSAWRN student at Rhodes University in South Africa, has tackled and completed a project of great value and considerable complexity: testing the effects of herbicide use on aquatic organisms in the Eastern Cape region, and developing guidelines for herbicide use based on the responses of those organisms.

Paul's interest in this topic grew out of his discovery that there were no such local guidelines in place, and considerable reason for concern, given the increasing use of herbicides by farmers, private land owners, public agencies, and the flourishing wine industry.

Paul, who was born in Ghana, has always dreamed of using his biological training to help protect the environment. When he was studying biology as an undergraduate at the University of Cape Coast in his home country, he hoped to move on to graduate school so that he could become a marine biologist and a university professor. After graduating with honors in 2001, however, he was unable to find sponsorship for his master's studies- like most other science graduates in Africa. He had no

Continued on page 68
choice but to enter the job market, and was fortunate to find work teaching in a secondary school in Ghana.

After four relatively unproductive years, he moved to South Africa in 2005 to try his luck in a new environment. Again, he supported himself by teaching in secondary school, enrolling at the same time in the new Walter Sisulu University in the Eastern Cape, recently formed by a merger of three other institutions. He saved as much money as he could from his teaching salary, and by 2006 was able to begin his MSc studies in zoology, working also as a teaching assistant at the university.

By 2008, he had completed his MSc and began trying to find a supervisor and support for PhD studies in ecotoxicology, an interest he had acquired at WSU. While searching the Web, he came across the name of Dr. Nikite Muller at Rhodes University's Institute for Water Research in Grahamstown. He emailed her, and she suggested that he apply to the RISE program as well as to Rhodes. In November 2008 he received an emailed acceptance from both programs.

Working with Dr. Muller and her colleague Prof. Tally Palmer, both members of the Institute for Water Research (IWR) at Rhodes, he had access to many potential research ideas. He would not be working in marine biology, as he had earlier planned, but he soon learned that he might be able to make a substantial contribution in freshwater biology. He heard about a problem that was receiving virtually no research attention in South Africa - the growing presence of toxic chemicals in waterways and the effects of these chemicals on aquatic organisms. Both of his mentors, who had long experience in the field of ecotoxicology, encouraged his interest and helped guide his research planning.

As he learned about the regional use of herbicides to control weeds and invading aquatic species, he was not surprised to find that the most widely used chemical was glyphosate, most commonly sold under the commercial name Roundup and liberally used throughout the province. He was surprised, however, to find that South Africa had no water quality guidelines for glyphosate that were based on indigenous species, unlike the United States, Australia, Canada, and the European Community - even though it has been found in high concentrations since the 1990s in the Hex River Valley, an intensive grape-farming area in the Western Cape Province.

There were reasons for urgency in creating science-based guidelines. One is that glyphosate is commonly used near and even on rivers and other waterways, draining into them when it rains. As an aquatic biologist, Paul knew that many species of aquatic animals are sensitive to chemical pollutants, and he saw the need to protect populations of economic and ecological value. Also, he learned that weed species in South Africa and elsewhere are quickly developing resistance to glyphosate, prompting some users to increase their application rates.

The action of glyphosate was discovered in 1970 by John Franz, an American chemist employed by Monsanto, and glyphosate was introduced commercially in 1974. Franz and his team discovered that the glyphosate molecule interferes with an enzyme vital to a critical biochemical pathway in virtually every plant, bringing farmers a powerful new tool in their war with weeds. And unlike its predecessors DDT and 2,4-D, glyphosate seemed to bring little or no risk to humans or other animals, in which this pathway is not present. For many years before Paul began his work, glyphosate was viewed by many agricultural researchers as the "perfect herbicide" - a broad-spectrum, systemic agent that killed virtually every weed and invasive species, broke down in the environment, and posed little risk to users.

Over the next two decades, glyphosate's popularity grew steadily but slowly. Farmers used it to spray fields before planting, but they could not use it after crops emerged. In 1996, however, this all changed when molecular geneticists succeeded in moving a glyphosate-resistant gene from a soil bacterium into ordinary crops. This meant that every major "world crop," from corn to rice to wheat, could be shielded from the danger of glyphosate, which could now be applied directly to the crops themselves and the weeds among them. Monsanto developed seeds for these resistant strains and watched the use of glyphosate soar around the world. Within a decade, some 90 percent of all major crops were grown with the Roundup Ready system, which included both the spray and the seeds. From then until now, about half of Monsanto's revenues have been generated by this system.

Recently, however, the Roundup picture has clouded somewhat. Persistent use of glyphosate has spurred the emergence of resistant weed strains, including some "superweeds" that dominate as the weeds around them succumb. And evidence is accumulating that the Roundup system is not quite as safe as it was thought to be. Numerous studies have found evidence that it does indeed harm some organisms, such as the nitrogen-
fixing bacteria in soil and many species of frogs, which are commonly viewed as the aquatic equivalent of "the canary in the coal mine."

While the glyphosate molecule itself is thought to be safe, it must be mixed with "adjuvant" chemicals, such as surfactants, that enhance its application or activity. It is these glyphosate formulations that appear to threaten some animals, often through changes in reproductive, endocrine, nerve, or developmental functions. Studies have also suggested that the formulations can alter the natural biota and nutrient availability of soil and damage human DNA, among other effects.

These assertions are disputed by Monsanto, and the heavy application of glyphosate has continued in regions worldwide, including the Eastern Cape. Paul's primary objective has been to evaluate its safety and to design evidence-based guidelines for use. In order to gain perspective for his work he began by examining other countries' guidelines. Then he began testing the sensitivity of local aquatic organisms.

Many of them showed some degree of sensitivity to glyphosate exposure, but he began by looking for a single reliable biomarker, or indicator species, that was both common and sensitive to herbicides. Through the IWR, he worked closely with the Department of Water Affairs at sites along the Swartkops River to plan his research strategy. He found what he needed in Caridina nilotica, a common fresh-water shrimp occurring throughout the continent, from the Nile to South Africa. He found that this shrimp is both sensitive to herbicide pollution and exhibits a range of responses that can be readily observed.

One was that Roundup depressed the activity of a vital enzyme, acetylcholine esterase (AChE); the higher the concentration of herbicide, the greater the depression of AChE activity. AChE is essential to the transmission of nerve signals, especially at nerve-muscle junctions and in the brain.

A second behavior of C. nilotica caused by glyphosate was lipid peroxidation (LPx), a process which results in the degradation of the fats in cell membranes. Paul tested this behavior by exposing post-hatch shrimps to high concentrations of Roundup for 96 hours to measure acute toxicity; he also exposed them to smaller amounts of herbicide over a much longer 21-day period.

Biochemical testing showed that LPx was significantly higher in animals exposed to Roundup than in control animals.

Finally, he assessed the toxicity of Roundup using three different life stages of the shrimp: neonates (less than seven days after hatching), juvenile (more than seven days and fewer than 20 days post-hatching), and adult (more than 40 days post-hatching). All were exposed to varying concentrations of the herbicide in 48- and 96-hour tests. All three life-stages of the shrimps that were exposed to herbicide responded with erratic and slow movements, with neonates showing the most irregular behavior. This indicated that even low levels of Roundup may adversely affect the health and survival of C. nilotica.

For his ultimate goal of suggesting guidelines for both short-term and long-term exposure to glyphosate, Paul chose to examine the responses of eight species of organisms belonging to five taxonomic groups: insects, crustaceans, mollusks, fish, and green algae. He measured the effects of both high-level, acute exposure, such as might be caused by spills and surface runoff, and to low-level, chronic exposure, as might be caused by gradual, steady seepage of herbicide from soil into nearby waterways.

He found wide variations in sensitivity among the test species. For example, the water flea, Daphne pulex, was about nine times more sensitive to glyphosate than the midge, Tanytarsus flumineus. For the algal species, Chlorella sorokiniana was found to be 10 times more sensitive in a 48-hour exposure than C. protothecoides, and 200 times more sensitive in a 72-hour exposure. Arthropods and fish were the least sensitive of the groups tested. Based on analysis of his data on species sensitivity, he was able to recommend water quality guidelines that can help avoid both severe effects during acute, transient events (such as spills) and long-term exposure. In general, he concluded that the herbicide should be carefully managed to minimize any negative impact on non-target freshwater organisms, and suggested the amount of herbicide that can be used safely. To date, Paul and his co-authors have published four papers on these results. He based his PhD thesis on this work, and it has been successfully completed.

Meanwhile, Paul's circle of connections in the world of freshwater management has expanded with the departure of Dr. Muller from Rhodes University. She left in 2010 to become an environmental officer with Amatola Water, a water services provider to municipalities in the Eastern Cape. She remains his co-supervisor, along with Prof. Palmer.

He now hopes to continue his study of the herbicide as a postdoctoral fellow if he is able to find support for his
work. Much remains to be done, as the use of glyphosate in the Eastern Cape continues to be heavy. The provincial government has been cooperating with Monsanto since 2005, when the company began providing farmers with GM seed and the Roundup regimen. "One result is that the farmers are using too much Roundup," said Paul.

"They believe that 'If some is good, more is better.' They are also using more no-till farming, which requires lots of herbicide. Ours is still the only field work being conducted on this issue, and we have the responsibility to communicate what we have found."

http://allafrica.com/stories/201301240929.html

Zimbabwe: Paraquat Herbicide Faces Ban

18 January 2013
The Herald

ZIMBABWE will work towards exhausting all stocks of the paraquat herbicide in line with China's research findings that the chemical is highly toxic and therefore unsuitable for continued use.

Principal director in the Department of Research and Specialist Services, Mrs Danisile Hikwa, said although China's research findings had not been officially communicated to all countries, it was critical for the country to take a cue and phase the chemical out.

The Chinese government announced that the country would halt all production and use of liquid paraquat by 2016 after Chinese researcher Sun Jing and other members of the Pesticide Eco-Alternatives Centre in China learned that local farmers were mysteriously falling ill and dying from effects of the chemical.

Sun suspected this had something to do with the herbicide paraquat that farmers were using. The farmers had no idea what a deadly chemical they were handling every day.

Paraquat is an acutely toxic weed killer. The chemical destroys green plant tissue on contact and is also toxic to animals. Direct contact on the skin causes death. Long-term exposure can result in Parkinson's disease and skin cancer.

China is the world's largest producer of paraquat, manufacturing 100 000 tonnes per year. Sun and her colleagues researched the chemical. "If there is information like that coming from China, it will soon be shared so that we look for alternative chemicals to use in weed control without endangering the lives of the farmers, biodiversity and other plants. Paraquat is not a selective herbicide and kills everything in its path on contact."

"It should not be a problem when it is phased out. We will just look for alternatives. There are conventions guiding the use of chemicals and Zimbabwe has ratified some of them so we have to conform."

The Rotterdam Convention for instance, which regulates the trade of chemicals and the Stockholm Convention that is concerned with the disposal of chemicals are some of the conventions to which Zimbabwe is a signatory and has to abide," said Mrs Hikwa.

She said it was now the prerogative of different countries either to stop the use of the chemical at once or to phase it out gradually. "There are stocks of the chemical in the custody of farmers out there and it will take time for all of them to be exhausted so we shall see how it goes before we can even think of setting our own deadline for the total ban of the chemical," she said.

Mrs Hikwa said paraquat was part of the chemicals that bear the purple label and were dangerous and traditionally not allowed to be handled by smallholder farmers without supervision from trained personnel.

Other chemicals the country banned because of their high toxicity include methylbromide and dichloro-diphenyl-trichloroethane (DDT). Mrs Hikwa's comments come in the wake of reports that several years ago, Global Greengrants Fund supported their work from the beginning and sustained it over several years.

http://allafrica.com/stories/201301180994.html

Kenya: FAO Gives Sh42 Million for Pest Control

22 June 2013
The Star

The Food and Agricultural Organisation will spend Sh42 million to implement a pest management programme with the Pests Control Products Board.

FAO programme associate Stanley Kimereh said the two-year funding will improve the PCPB's laboratory capacity to analyse pesticides.

Kimereh was speaking at the PCPB offices in Nairobi yesterday when he joined Israeli ambassador Gil Haskel on a courtesy call on the board's director Gladys Maina.

http://allafrica.com/stories/201301180994.html
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The three discussed ways in which FAO and the Israeli government can help build the capacity of PCPB laboratories and train field staffs to ensure only effective pesticides are used.

http://allafrica.com/stories/201306240104.html

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Africa: Governments Urged to Limit Weed Killer Found in Humans

17 June 2013

Washington DC / Brussels (belgium) — Friends of the Earth International today urged governments around the world to limit the use of the weed killer glyphosate, after laboratory test results released last week showed that people across 18 European countries have traces of the weed killer in their bodies. [1]

Media briefing on glyphosate and reasons for concern available at: www.foeeurope.org/glyphosate-reasons-for-concern-briefing-130613

The unprecedented tests carried out by Friends of the Earth Europe revealed that 44% of samples from 182 volunteers in 18 European countries contained traces of the herbicide [2].

Glyphosate is one of the most widely-used weed killers in the world, used by farmers, local government and gardeners, and is sprayed extensively on genetically modified crops.

In the United States and Latin America, farmers are using increased amounts of pesticides, -including glyphosate- due largely to the heavy adoption of genetically modified crops. [3]

The biggest producer of glyphosate is US biotech giant Monsanto which sells it under the brand name "Roundup".

Lisa Archer, Food and Technology Program Director of Friends of the Earth US said:

"Discovering traces of glyphosate in Europeans raises serious questions. How did it get there? Why aren't governments testing for it? And is it also present in Americans citizens? Unlike Europe, the US grows vast amounts of glyphosate-resistant crops, which have resulted in a massive application of herbicides and superweeds.. Some of them are already out of control. Monsanto's unauthorised genetically modified wheat recently discovered in US fields is the latest alarm bell and confirms the need for stricter controls on agribusiness."

In May 2013 a strain of genetically-engineered glyphosate-resistant wheat was found on a farm in Oregon, USA. The wheat was developed by Monsanto which tested it between 1998 and 2005. The wheat has never been approved nor marketed. Trading partners have since introduced restrictions or testing of US wheat imports. [4]

Adrian Bebb, spokesman for Friends of the Earth Europe said:

"Agribusinesses that promote GM crops and pesticides like to pretend they have things under control - but finding this weed killer in peoples' urine suggests we are being exposed to glyphosate in our everyday lives, yet don't know where it is coming from, how widespread it is in the environment, or what it is doing to our health."

"Governments around the world need to limit glyphosate use, step up their investigations, and ensure that people and the environment are put before the interests of a few agribusiness corporations," he added.

According to 2010 figures, 70% of all the corn that was planted in the United States had been genetically modified to be herbicide resistant; as well as 78% of cotton and 93% of all soybeans. [5]

In Europe there has been widespread opposition to GM crops, with only one GM crop grown commercially, although there are 14 applications currently being considered by the EU to grow glyphosate-resistant crops.

In Argentina, 200 million litres of glyphosate-based pesticides are used yearly on soy plantations alone[6]

NOTES

[1] This is the first time monitoring has been carried out across Europe for the presence of the weed killer in humans. All of the volunteers who gave samples live in cities, and none had handled or used glyphosate products in the run up to the tests.

http://allafrica.com/stories/201306181375.htm

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Tanzania Told to Sever Link with Monsanto

By Nizar Visram

27 June 2013

Pambuzuka News

Continued on page 72
Tanzanian President Jakaya Kikwete is an enthusiastic supporter of Monsanto, but now pressure is mounting on his government to reject GMO technologies as solutions to end hunger.

Normally Tanzanian lawmakers would 'prove' their radicalism by blasting rival parties, state authorities, public corporations or ministers for shoddy work done or millions that go missing. They would hardly ever take a swipe at a multinational corporation, much less an American one.

Yet that is what happened recently when Hon Halima Mdee (Chadema) called upon the government to sever its relations with the international seed company Monsanto, which is a major stakeholder in the country's campaign for a green revolution.

She reminded the government that the firm had caused farmers misery and suffering in many countries, including the US, where it is based.

The company, known for the production of genetically modified seeds, has been blacklisted in India, Argentina, Chile and eight European countries because the seeds it sells to farmers at high prices have been a disaster, prompting some nations to institute legal action against it, Ms Mdee said.

'Last year the company committed $50 billion to producing seeds for Africa, but the firm is known around the world as a major producer of genetically modified seeds, which are harmful to farmers and the environment,' she cautioned.

Ms Mdee suspected that given the company's bad reputation, President Jakaya Kikwete might have been misinformed by his aides. 'This is because we know that these large multinationals have a tendency to use their financial muscle to compromise government leaders.'

Shadow Agriculture Minister Rose Kamili noted that India has banned the use of cotton seeds produced by Monsanto after research established that they were a threat to farmers and the environment.

In fact more than 1,000 farmers had committed suicide as a result of debts resulting from buying seeds from Monsanto at high prices.

The points brought up by the two ladies hardly triggered any reaction or rejoinder. Probably the lawmakers were not well informed of the subject matter, or they were not too keen to irritate the conglomerates who promote genetically modified organisms (GMO) and the donor agencies that back them.

Yet the debate is no doubt raging within the civil society, among groups that are running concerted campaigns against GMO. But they are not having an easy ride, for Monsanto is applying pressure in the country for amendment to regulations so as to allow GMO.

They are using local scientists and researchers as well as state bigwigs. The firm reportedly provides all the means, from laboratory to foreign travels. In the course of doing this, they manage to get local spokespersons and mouthpieces.

Tanzania Alliance for Biodiversity is not among them. This is a joint coalition that is trying to maintain agricultural biodiversity for food sovereignty and security. It aims at sustainable development, promoting self-determination and facilitating exchange of information and experiences among farmers.

Alliance members are convinced that the introduction of GM crops or animals is not the right solution to poverty and hunger as claimed by the likes of Monsanto.

They are concerned that while Tanzania has so far been GM free, the country has now opened the door to GM biotechnology.

The Alliance has collected various campaigners, including African Centre for Biodiversity, ActionAid International Tanzania, Biolands, BioRe, BioSustain, Envirocare, PELUM Tanzania, Swissaaid, and Tanzania Organic Agriculture Movement.

They join similar movements in South Africa, Zambia, Kenya, and Uganda, to resist the pressure from the US-driven biotech industry.

On the other side, agribusiness corporations try their level best to promote what they claim to be high-tech miracle seeds for solving the problem of African food insecurity and poverty.

One supporter they apparently managed to bag is none other than President Jakaya Kikwete himself who, in March this year, came out in defence of Monsanto, heaping the blame on those who challenge them, saying they are 'uninformed' and so need to educate themselves.

He called for a transformation of the 'negative mindset' on the adoption of GM technology in the country, challenging scientists in the country to conduct research to establish the 'practicality of the technology', stressing that as long as there are 'no proven major negative impacts', he saw no logic in opposing the application of the technology.

His prime minister, Mizengo Pinda, also accused those who oppose GMO of being 'slow in accepting the
Continued from page 72 - Tanzania Told to Sever Link with Monsanto

opportunity' offered by the technology, claiming that Kenya and Uganda are 'far ahead of us in its application'.

Thus, at the official level Tanzania supports the plan to conduct research on genetically modified crops in the country. The agriculture minister said that Tanzania was aimed at keeping up with the new technology in order to modernise agriculture and promote balanced economic growth. He said the time for being rigid on the use of GMOs was over.

Nothing is being said about the decision taken by the European Union, who banned GMO crops on grounds such as pesticide resistance and threats to biodiversity or potential negative effects on the environment.

What the Tanzanian and African apologists of GMO have to keep in mind is that traditionally the seed and its control has been the foundation of their agricultural sector. After all some 80% of seed comes from local and communal resources and is adapted to local conditions. It is thus an integral part of the communal food security and agricultural integrity. With the onslaught of GMO this traditional system is undermined.

This is what happens when commercial interests, supported by the World Bank, together with front organisations and self styled philanthropists, attempt to alienate this crucial resource.

This is done by giant multi-national seed and pesticide companies that are promoting hybrid and genetically modified seed. While they claim to assist the development of African agriculture, the end result is disastrous.

One example is the South African seed industry - the biggest in Africa - whose deal was recently sealed when the country's court permitted the sale of its last remaining large seed company, Pannar, to the US multinational Pioneer, a subsidiary of DuPont. With this the US firm is to take over Pannar's African network.

It means South Africa's valuable seed industry is grabbed by world's two largest US seed companies at are to use South Africa to gain inroads into Africa, with serious consequences for indigenous seed networks.

Meanwhile, organisations like the Alliance for a Green Revolution in Africa (AGRA) claim that new seed being developed for Africa will be freely distributed to smallholder farmers.

What happens is that these giant seed corporates transfer the experience of South America to Africa. In South America the herbicide-resistant GM soya that was patented by Monsanto was surreptitiously encouraged.

When the soy industry became widespread, Monsanto started to claim royalties on all the soy grown, since it established the right to its intellectual property. Luckily the attempts in Brazil were overruled in the courts and Monsanto was ordered to refund billions of dollars to farmers.

When the soy industry became widespread, Monsanto started to claim royalties on all the soy grown, since it established the right to its intellectual property. Luckily the attempts in Brazil were overruled in the courts and Monsanto was ordered to refund billions of dollars to farmers.

It is practice such as this that prompted the online campaign run by Avaaz for a global petition aiming at exposing Monsanto's worldwide grip, cautioning that the mega-company is gradually taking over our global food supply, poisoning our politics and putting the planet's food future in serious danger.

The petition shows how Monsanto develops pesticides and genetically modified seeds, patents the seeds, prohibits farmers from replanting their seeds year to year, then sends undercover agents out to investigate and sue farmers who don't comply.

The firm spends millions lobbying US government officials, contributing to their political campaigns, then works with them to push Monsanto goods into markets across the world.

Monsanto is trampling small farmers and small businesses as vast 'monoculture' farms of single crops leech the land of nutrients, diminish genetic diversity, and create dependency on fertilizers, pesticides and other chemicals.

'Monsanto's power in the US gives them a launch pad to dominate across the world. But brave farmers and activists from the EU, to Brazil, to India and Canada are resisting and starting to win,' Avaaz proclaims.

The online petition shows how farmers are lured into multi-year contracts, then seed prices rise, and they have to buy new seed each season and use more herbicides to keep out 'super weeds'. In India, the situation is so dire that one cotton area has been called 'the suicide belt', as tens of thousands of the poorest farmers have taken their lives to escape crippling debt.

It is not surprising, therefore, that, at the end of November 2012, Kenya banned the importation of genetically modified food on health grounds.

A stormy public 'debate' ensued. There were those on the

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side of 'modernity' and 'science', denouncing the lack of 'scientific evidence' among their opponents.

Such defence of GMO is not surprising. The Consultative Group on International Agricultural Research provides USD $25 million annually to biotechnology research globally. At the same time bilateral aid agencies - especially from the United States - provide 60 per cent of research funding for biotechnology.

Private philanthropic foundations are also involved in funding the research. They include the Howard Buffet Foundation, the Bill and Melinda Gates Foundation and the Rockefeller Foundation. Multinational biotechnology companies, including Monsanto and Syngenta, also chip in.

In so doing they try to stymie the debate that is going on globally. However, they only succeed in extending the battle against GMO to Africa, where farmers are putting up a strong resistance to so-called modernity.

http://allafrica.com/stories/201306280948.html

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Another win for Monsanto: US raises allowable Levels of Company’s Pesticide in Crops

July 23, 2013

Biotech giant Monsanto has been awarded yet another victory by the federal government thanks to a recent Environmental Protection Agency decision to allow larger traces of the herbicide glyphosate in farm-grown foods.

Despite a number of studies linking exposure to the chemical with diseases including types of cancer, the EPA is increasing the amount of glyphosate allowed in oilseed and food crops.

The EPA announced their plans on May 1 and allowed critics two months to weigh in and object to the ruling. Following little opposition, though, the EPA is on path to soon approve of levels of glyphosate being found in crops several times over the current concentration.

Glyphosate, a weed-killing chemical developed by Monsanto in 1970, is the key ingredient in the company’s “Roundup” label of herbicides. In the decades since, Monsanto has created and patented a number of genetically-modified organisms and genetically-engi-

neered crops resisted to glyphosate that are sold worldwide under the company’s “Roundup Ready” brand. Those GMO products are then planted in fields where glyphosate, namely Roundup, is used en masse to eliminate weeds from taking over harvest. With scientists linking that chemical to cancerous diseases, though, critics decry the EPA decision and caution it could do more harm than good.

Through the EPA’s new standards, the amount of allowable glyphosate in oilseed crops such as flax, soybeans and canola will be increased from 20 parts per million (ppm) to 40 ppm, which GM Watch acknowledged is over 100,000 times the amount needed to induce breast cancer cells. Additionally, the EPA is increasing limits on allowable glyphosate in food crops from 200 ppm to 6,000 ppm.

Just last month, The Cornucopia Institute concluded a study by finding glyphosate “exerted proliferative effects in human hormone-dependent breast cancer.” A similar study released in April concluded that “glyphosate enhances the damaging effects of other food borne chemical residues and environmental toxins.”

“Negative impact on the body is insidious and manifests slowly over time as inflammation damages cellular systems throughout the body,” independent scientist Anthony Samsel and MIT’s Stephanie Seneff concluded in the April study. “Consequences are most of the diseases and conditions associated with a Western diet, which include gastrointestinal disorders, obesity, diabetes, heart disease, depression, autism, infertility, cancer and Alzheimer’s disease.”

Dr. Don M. Huber, emeritus professor of plant pathology at Purdue University, found in yet another examination that “Glyphosate draws out the vital nutrients of living things,” in turn removing most nutritional value from GMO foods.

A press release issued by the group Beyond Pesticides criticized the decision as well. “Given that alternative methods of growing food and managing weeds are available, like those that exist in organic agriculture, it is unreasonable for EPA to increase human exposures to Roundup,” they wrote.

In the past, Monsanto has long-defended their use of the chemical. “We are very confident in the long track record that glyphosate has,” Jerry Stainer, Monsanto’s executive vice president of sustainability, stated previously. “It has been very, very extensively studied.”

http://rt.com/usa/monsanto-glyphosate-roundup-epa-483/

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A weed killer sprayed on 80 percent of genetically modified foods—including corn, soybeans, sugar beets, and cottonseed—could be linked to obesity, digestive diseases, and other chronic disorders including diabetes, Alzheimer’s, and even cancer, according to a new Massachusetts Institute of Technology (MIT) paper published in the journal Entropy.

Without genetic modification, herbicides would damage crops, making them susceptible to insects and disease. To solve this issue, genes within the seeds of various produce have been tweaked to be tolerant of the herbicide, thus protecting them from the mouths of hungry bugs. The downside, according to the study, is that the herbicides used to protect the plants are harmful to humans.

The peer-reviewed paper reports that residues of glyphosate—the active ingredient in the world’s most widely used herbicide, Roundup—are ubiquitous in the main foods of the Western diet. Glyphosate is the most common agricultural chemical in the US, with 185 million tons sprayed on American crops in 2007—more than double the total for 2001, the EPA reports.

'Damages Cellular Tissue' in the Body

“Glyphosate in our food is making us fat and sick,” says Stephanie Seneff, Ph.D., coauthor of the paper and senior research scientist at MIT. “It’s the number one cause of obesity in this country and rates of obesity have shot up in tandem with increasingly heavy use of this herbicide.”

What’s more, “glyphosate ... may in fact be the most biologically disruptive chemical in our environment,” the paper states. “Negative impact on the body is insidious and manifests slowly over time as inflammation damages cellular systems throughout the body.”

However, the EPA, which set a new rule in April limiting the amount of Roundup residue allowed in various foods—from cereal grains to carrots, oil seeds, sugar cane, beef byproducts used for hot dogs and school lunches, and potatoes, among many others—contends that, “there is reasonable certainty that no harm will result to the general population . . . or children from aggregate exposure to glyphosate residues.”

Monsanto, manufacturer of Roundup, has long maintained that Roundup and GM food are safe. When asked about the MIT paper, Jerry Steiner, Monsanto’s executive VP of sustainability told Reuters that, “We are very confident in the long track record that glyphosate has. It has been very, very extensively studied.”

So who’s right? Here’s a closer look at the paper and other new research exploring the health effects of genetically modified organisms (GMOs) in our food.

Is Roundup really dangerous?

The agricultural industry has argued that although Roundup is designed to kill plants, it’s relatively nontoxic to people, because glyphosate acts on a biological pathway that’s not found in humans or animals.

Furthermore, the amounts found in food are very small, with the EPA setting limits ranging from 0.2 parts per million (ppm) for avocados to 30 ppm for cereal grains and 85 ppm for safflower seeds. Feed for farm animals can contain up to 400 ppm.

Based on a wide-ranging review of published research, including animal studies, the paper argues that amounts as low as 0.1 ppm can affect both our health and weight, says co-author Anthony Samsel, a retired science consultant from Arthur D. Little. “Even tiny amounts set off a cascade of harmful effects and also magnify the toxic effects of other chemicals in our food and environment.”

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He adds, “It’s like slow poisoning with small amounts of arsenic. At first, you feel fine, but over time, the toxin builds up in your body and does more and more damage.”

What’s the link with obesity and illness?

The paper reports that eating foods that contain glyphosate sets off a chain reaction. First, the chemical, which is known to have antibiotic effects, kills off good bacteria in our gut, which contains 70 percent of the cells that comprise the immune system.

“Two papers discussing gut bacteria in chickens and cows show that glyphosate—which is frequently found in animal feed—causes an overgrowth of pathogens,” says Dr. Seneff. “This results in several problems, since the gut can’t absorb nutrients in food properly and the body’s ability to get rid of toxins and defend against diseases is reduced.”

Additionally, says Samsel, “there’s a disruption in production of three essential amino acids, including tryptophan, the precursor to serotonin, a brain chemical that helps regulate appetite, satiety, and insulin levels. This creates a vicious cycle in which people don’t feel full and overeat, leading to weight gain and obesity.”

Is there any other evidence linking GM food to weight gain?

Last year, a long-term international study reported that when rats were fed GM corn, they were fatter after 90 days than a control group of rats that ate non-GM corn. Researchers found that the same thing occurred when rats ate fish that, in turn, had consumed GM corn.

GM corn is one of the more common crops specifically designed to withstand Roundup. The international study also looked at the effects of GM food on salmon. Fish fed a GM diet seemed to be outwardly healthy, but were larger and ate more than fish that didn’t receive GM food.

Fish on a GM diet also were less able to digest proteins and had alterations in their immune system and gut not found in the salmon on a non-GM diet. Subtle changes in other organs, including the kidneys, liver, pancreas, and reproductive organs were also observed.

Which foods contain Roundup residues?

“If you are eating the typical Western nonorganic diet that includes anything made from corn, soy, canola, wheat, sugar (both cane and sugar beet), cottonseed oil, sunflower, carrots, okra, potatoes, lentils, beans, and peas, or meat, then you’re almost certainly consuming glyphosate,” notes Samsel.

There are three ways that this chemical gets in our food. Monsanto developed Roundup in 1974 as a weed-killer. It’s most commonly used on crops that are genetically modified to be Roundup Ready, meaning that the plants have had their DNA altered to withstand a chemical that would otherwise kill them.

“In addition, the EPA allows much higher levels of glyphosate in animal feed than it does in human food, which is how this chemical gets in meat, chicken, and eggs,” adds Samsel.

He notes that Roundup is also used to dry out certain crops, such as wheat and potatoes, so they are easier to harvest.

How to Avoid the Health Effects of Roundup Residue

If you’re concerned about glyphosate in your food, try these strategies to limit exposure, protect digestive health, and maintain a healthy weight, suggest Seneff and Samsel:

- **Go organic.** Certified organic foods are free of potentially hazardous chemicals and additives. In addition, strict labeling and production rules ban genetically modified organisms (GMOs) as ingredients.

- **Look for the Non-GMO Project Seal.** Foods labeled “Non-GMO Project Verified” have been checked by the Non-GMO Project, a nonprofit that requires testing of all ingredients to make sure they don’t contain GMOs. The Non-GMO Project has a free shopping app for the iPhone, iPod Touch, and iPad that’s searchable by brand name and product type.

- **Avoid risky ingredients.** Foods most likely to contain glyphosate include sugar, wheat, soy, canola, cottonseed oil, corn, non-organic meat, and certain processed foods. About 75 percent of the processed foods on supermarket shelves contain GM ingredients, the Center for Food Safety (CFS) reports.

- **Consider going soy-free.** The USDA reports that 90 percent of the soybean samples it tested contained glyphosate. In addition, 12 different pesticides were detected. However, all residues were below the EPA’s limits.

- **Buy locally grown produce.** Since GMO crops are typically grown on large industrial farms, it’s much less likely that the small farmers who participate in farmer’s markets or food coops will be producing these foods. To make a smart shopping decision,
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ask the farmers about their cultivation methods, and which chemicals—if any—they use on their fruits and vegetables.

- **Take probiotics.** These “good” bacteria found in yogurt, fermented foods, and supplements support digestive health. There’s also evidence that they may aid weight loss. **Researchers report** that probiotics help obese people drop pounds weight more quickly after gastric bypass surgery.

- **Eat foods that are rich in tryptophan.** Since Roundup residue may interfere with tryptophan production, it may help to add more sources of this essential amino acid to your diet. Among the best dietary sources of tryptophan, which **helps elevate mood, improve sleep, and regulate appetite**, are chicken, tuna, turkey, salmon, shrimp, lamb and cod.

  ![Link](http://health.yahoo.net/experts/dayinhealth/genetically-modified-food-making-us-fat)

Melanin-Concentrating Hormone found to be involved with Insulin Production

January 28, 2007

A new **Joslin Diabetes Center**-led study has shown conclusively that a neuropeptide, melanin concentrating hormone (MCH), found in the brain and known for its role in increasing appetite in people, plays a role in the growth of insulin-producing beta cells and the secretion of insulin.

This finding has the potential to spur the development of new treatments for **diabetes** that stimulate the production of insulin-producing beta cells in the **pancreas**. This latest research, conducted with researchers at **Beth Israel Deaconess Medical Center** in Boston and other institutions, will appear in the February 2007 issue of **Diabetes**.

An earlier Joslin-led study examined the connection between **obesity** and MCH, which plays a critical role in energy balance and appetite, observing an increase in the number of beta cells when MCH levels are high. This was a new finding that had not been observed before. Although MCH’s role in appetite control is well known, its effects on the secretion of endocrine **hormones** has not been fully understood.

"It's a very logical connection," says Rohit N. Kulkarni, M.D., Ph.D., investigator at Joslin Diabetes Center and Assistant Professor of Medicine at Harvard Medical School, who led the study. "Whenever you eat food, your body needs more insulin. When MCH induces appetite, it simultaneously increases insulin secretion from beta cells and enhances growth of beta cells. If the proteins that mediate the growth mechanism can be identified, it could lead to the development of new drugs that would enhance beta cell growth to treat type 1 and **type 2 diabetes**."

In **type 1 diabetes** (insulin-dependent) diabetes, which accounts for 5 to 10 percent (between 700,000 and 1.4 million people) of diabetes cases in the United States, an autoimmune process has destroyed the insulin-producing islet cells in the pancreas. In type 2 diabetes, the far more common form of the disease, the body doesn't produce enough **insulin** and/or can't use insulin properly (**insulin resistance**). Both diseases could benefit from treatments that stimulate beta cells in the pancreas to produce insulin.

In the first study, in which mice were genetically engineered to over-express MCH, Dr. Kulkarni and his colleagues observed changes in beta cell mass out of proportion with the degree of obesity, suggesting that MCH had a direct effect on islets. To build on these previous findings, the researchers focused this study on gaining a deeper understanding of how MCH and its receptors influence growth of beta cells.

The investigators first confirmed that MCH and its receptors are indeed expressed in islet cells of mice and humans. They then treated human donor or mouse pancreatic islet cells with MCH and found that it increased insulin secretion, compared to islet cells without MCH, which did not show the same effect.

In the next phase, the researchers examined genetically-engineered mice that did not produce MCH and consequently had abnormally small islets. "This indicated to us that MCH is important for growth of islets," says Dr. Kulkarni.

The next step in the research process is to pinpoint exactly how MCH is regulating the growth of beta cells and identify which proteins are involved in this growth process. "We know MCH is having an effect on both growth and function likely by recruiting different proteins. It will be worth exploring which proteins are being activated by MCH to cause the growth effect," Dr. Kulkarni explains.

A follow-up study has been designed and is currently

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awaiting funding. It will look at how MCH interacts with glucagon-like peptide 1 (GLP-1), a hormone involved in beta cell growth. An analogue of GLP-1 hormone has already been approved by the FDA for treating type 2 diabetes. The goal is to understand how GLP-1 and MCH can work together to promote beta cell growth.

http://www.joslin.org/


Melanin Production Discovered In Fat Tissue May Protect Some Individuals against Chronic Diseases Associated With Obesity

ScienceDaily (Nov. 7, 2008) — A two-year study conducted by researchers at George Mason University, INOVA Fairfax Hospital and the National Cancer Institute may open the door to new therapies for combating chronic diseases associated with obesity, a condition that affected more than 33 percent of American adults in 2005-06 according to the Centers for Disease Control and Prevention.

While analyzing samples taken from morbidly obese patients undergoing weight loss surgery, the researchers discovered that substantial quantities of melanin—a pigment that gives the skin, the hair and the iris of the eye their natural color—were being produced in the study participants’ fat tissue.

Ancha Baranova, assistant professor in George Mason University’s Department of Molecular and Microbiology and the paper’s lead author, explains that melanin production has never before been identified in fat tissue. She believes that the antioxidant, which has been shown to have anti-inflammatory properties, could be the body’s natural defense against obesity-related conditions such as type 2 diabetes, coronary heart disease, fatty liver disease, polycystic ovary syndrome and some cancers.

“Stockpiling extra calories is difficult even for specialized fat cells; having too much lipid molecules takes its toll on the fat cells, producing oxidative stress,” says Baranova. “It’s not unthinkable that these cells would adapt and produce melanin as a form of self-protection. As a side benefit, melanin may suppress inflammatory properties of the extra pounds of the fat.”

Baranova notes that a larger study is needed in order to confirm the role that the body’s production of this compound plays in fat tissue. However, the discovery suggests that melanin-based therapies may one day be used to reduce the incidence of chronic diseases among the morbidly obese.

“This opens an entirely new avenue for medical interventions because the process of biosynthesis of melanin is relatively easy to meddle with,” says Baranova. “We hope that this study will spur the development of preventive medications aimed at curtailing devastating metabolic complications in obese and overweight populations.”

The paper was co-authored by Manpreet Randhawa, Tom Huff and Vikas Chandhoke of George Mason University; Julio C. Valencia and Vincent J. Hearing of the National Cancer Institute; and Zobair Younossi of INOVA Fairfax Hospital. The study was funded by the Thomas F. Jeffress and Kate Miller Jeffress Memorial Trust and by the Intramural Research Program of the National Cancer Institute at the U.S. National Institutes of Health.

Journal reference:

Randhawa et al. Evidence for the ectopic synthesis of melanin in human adipose tissue. The FASEB Journal, 2008; DOI: 10.1096/fj.08-116327


New Drug Target in Obesity: Fat Cells Make Lots of Melanin

ScienceDaily (Oct. 30, 2008) — As millions of Americans gear up for the Thanksgiving holiday, a new research report published online in The FASEB Journal, may provide some relief for those leery of having a second helping. In the report, researchers describe a discovery that may allow some obese people avoid common obesity-related metabolic problems without actually losing weight: they make a common antioxidant, melanin, in excess.

Even more promising is that some of the antioxidant drugs that can mimic the melanin effect are FDA-approved and available. This availability would greatly speed the development of new treatments, should they prove effective in clinical trials.

The researchers made the unexpected discovery--fat cells in obese people produce melanin in excess--when they were comparing fat cells of obese people to those of

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people with normal weight. After the comparison, they found that the gene responsible for making melanin was working in "overdrive" in the fat cells of obese people. The finding was then confirmed using additional laboratory tests. Melanin is a common antioxidant responsible for skin and eye color.

Ancha Baranova, one of the study's researchers from George Mason University and INOVA Fairfax Hospital says, "Most scientific efforts aim at making obese individuals lose weight, but this has proven difficult.

Hopefully, this study will lead to a drug that keeps obese individuals healthy, reducing the cost-burden to society as well as some of the stigma associated with this condition."

According to the U.S. Centers for Disease Control and Prevention, the prevalence of obesity in 2005-2006 was about 1 in 3 for men and women. Obesity increases the risk of diseases and health conditions, such as high blood pressure, osteoarthritis, dyslipidemia, Type 2 diabetes, coronary heart disease, stroke, gallbladder disease, sleep apnea and respiratory problems, and some cancers.

"No pill can replace a healthy diet and exercise, yet," said Gerald Weissmann, MD, Editor-in-Chief of The FASEB Journal, "but this could be a major advance for physicians looking for a safe drug target in their search to keep obese patients healthy while their weight becomes normal."

Journal reference:

http://www.sciencedaily.com/releases/2008/10/081029121812.htm

Why are Obese People at Risk of Type-2 Diabetes?

By India.com Health

February 6, 2013

Regardless of a person's age, gender or body mass index, pesticides in food, air and water may be directly linked with the development of type 2 diabetes, a new Spanish research study has found.

These substances tend to concentrate in body fat, and they might be one of the reasons why obese people are more likely to develop diabetes, since the greater the fat, the higher the pesticide concentrations in the body, researchers from the University of Granada found.

Researchers demonstrate that people with higher concentrations of DDE – the main metabolite in the pesticide DDT – are four times more likely to develop type 2 diabetes than other people, the journal Environmental Research reports. In addition, the risk of type 2 diabetes is also associated with exposure to I-HCH (beta-Hexachlorocyclohexane), which is present in the formula of the pesticide Lindano, according to a Granada statement.

Researchers analyzed concentrations of a specific group of pesticides in the adipose tissue of 386 adult subjects at San Cecilio hospital, Granada, and Santa Ana hospital, Motril, Spain. Granada researcher Juan Pedro Arrebola said: 'Human adipose tissue (fat) acts as an energy reservoir and has an important metabolic function. However, adipose tissue can store potentially harmful substances, such as persistent organic pollutants (POPs-pesticides).’ POPs are a group of chemicals with diverse characteristics which are present in pesticides, industrial waste and building material. These compounds penetrate the body mainly through food, but also through air or the skin.

The prevalence of diabetes in the world has significantly increased in the last decades. It is estimated that by 2030, 4.4 percent of the world population will live with this metabolic disorder. Source: IANS


The Effects of Persistent Organic Pollutants (POPs) in Weight Loss and How to Mitigate Them

Summary
Research now indicates that a patient's levels of persistent organic pollutants (POPs) should be evaluated prior to weight loss. Because POPs are stored in body fat, weight loss can generate significant releases of toxicants into the body. Elizabeth Redmond, PhD, MMSc, RD and Terry Pollock, MS

Details
A 40-year-old overweight patient goes to the doctor before she starts a weight loss program. What should the doctor check? Continued on page 80
Adipose Tissue: A Storage Site for Persistent Organic Pollutants (POPs)

Research now indicates that the doctor should evaluate the patient’s levels of POPs prior to weight loss. This evaluation is especially important in middle-aged and older adults since toxins accumulate with age. Persistent organic pollutants, such as polychlorinated biphenyls (PCBs), hexachlorobenzene (HCB), and p,p'-dichlorophenyldichloroethylene (DDE) are ubiquitous microcontaminants that are lipid soluble and accumulate in stored fat. A type of fat known as white adipose tissue (WAT) constitutes 15 to 25% of body weight and can increase greatly in the morbidly obese. This tissue serves as a depot for lipophilic contaminants like POPs. Weight loss can facilitate significant releases of these toxicants, often leading to an increase of symptoms which may prevent further or optimal loss of fat. Though banned, these POPs are an ever-increasing problem that may affect the endocrine, nervous and immune systems; storing them in adipose tissue may be a defense mechanism. Due to these issues the CDC has expanded their evaluation of these toxic compounds in the National Health and Nutrition Examination Survey (NHANES). The NHANES is a program of studies designed to assess the health and nutritional status of adults and children in the United States. Physicians need to be aware of their patient’s levels of POPs, how these toxic compounds are released during weight loss, the possible effects they can have, and ways to ameliorate their release. Answering these questions and treating these issues may help patients complete weight loss programs and avoid regaining weight, with the significant advantage of reduced toxic burden.

Testing Toxin Levels

The measurement of chemicals and biomarkers has revolutionized the field of exposure assessment. The Centers for Disease Control and Prevention (CDC) published the National Report on Human Exposure to Environmental Chemicals, which provides an ongoing assessment of 148 chemicals found at detectable levels in the U.S. population using biomonitoring. The blood and urine samples were collected from a statistically representative sample of the U.S. population during NHANES. The CDC has therefore established 95th percentile reference limits for many of these organic pollutants, allowing physicians to compare their patients’ levels against a national standard. Certain of these organotoxins can now be analyzed using private laboratories. Current, and anticipated, scientific advances can permit broader toxicity testing coverage of the universe of potentially toxic chemicals to which humans may be exposed. By 2010, it has been predicted that the CDC will be monitoring nearly 1000 chemicals, a significant advance, yet small considering the estimated 80,000 chemicals in use.

Main Sources of POPs

Contrary to common belief, there is still a body burden of banned chemicals due to the persistence of these compounds in the environment, to their continued use in other countries and to the fact that animal feeds are the main source of POPs in the human food chain. Studies by LaRocca have shown that the majority of human exposure to PCBs, for example, is derived from foods of animal origin. Storage of these compounds can result in increased concentrations in fatty tissues, muscles and organs, which can induce various adverse health effects. In addition to foods of animal origin, POP’s are also found in pesticides, building materials, plastics, cosmetics and perfumes. In other words, most sources surround us in our homes, offices and schools.

Toxic Effects of Exposure to POPs

The potential of these pollutants to impair immune responses and trigger autoimmune disease is of growing concern. POPs show structural similarity to thyroid hormones. Some effects of exposure include developmental and reproductive toxicity, dermal toxicity, endocrine effects, hepatotoxicity, carcinogenesis, and the induction of diverse phase I and phase II drug-metabolizing enzymes. Endocrine effects of organic pollutants seem to occur through mimicking the body’s natural steroid hormones, and by interfering with the adipocyte phenotype. Mullerova and Kopecky have described plausible mechanisms for POP interference in fat metabolism via modulation of estrogen-regulated genes, disordered estrogen biosynthesis in WAT, inhibition of peroxisome proliferator-activating receptors (PPARs) and disruption of other aspects of the fat cell transcription machinery. Emerging evidence has also demonstrated that polychlorinated aromatic hydrocarbons (PHAH), particularly polybrominated diphenyl ethers (PBDE), alter thyroid hormone homeostasis and cause thyroid dysfunction. Release of organochlorines were found to impair thyroid status, which may reduce resting metabolic rate (RMR) and decrease in serum T(3), further exacerbating weight loss issues.

Toxicants and Weight Loss

Weight loss has been shown to mobilize PCBs and other...
POPs from lipid stores producing an increase in blood concentrations of these potentially toxic organochlorines. The level of plasma organochlorine and pesticide compounds is related to total weight lost. Thus weight loss strategies that produce significant or quick decreases in weight have been shown to lead to greater increases in plasma organotoxin levels. There is a measured and persistent release of toxins shown in plasma up until a change in BMI greater than 14 kg/m², when blood concentrations jump sharply. It is therefore advisable to calculate a patient’s anticipated change in BMI. An increase in organotoxins may explain why some patients begin to feel like they are being poisoned during the first part of a weight loss program, possibly contributing to the difficulty of sticking with a program or why patients regain weight so quickly. Clinicians working in the field of bariatrics encountering weight loss resistance in their patients have speculated that it may be the result of a toxic interference.

Minimizing Exposure to POPs
Mitigating the toxic effects of exposures to POPs (or to any toxic substance) necessitates avoiding or minimizing overall exposure to such compounds. Minimizing exposure to POPs is more efficient, effective and economical than eating/storing/eliminating them from our bodies. High fat animal products are a primary contributor to POP intakes. Dairy products, processed foods, and meat are major contributors of PCB and dioxin accumulation. Consuming fewer animal products and cleaner sources are prudent measures. Industrial, toxicant-promoting agricultural practices such as CAFOs contribute significantly to the increase of toxins in our food supply. Lower toxin levels are found in vegans and vegetarians, as well as those who consume greater quantities of vegetables, fruits, whole grains, nuts, seeds, beans and wild caught young fish. Epidemiological research has consistently shown this diet to be healthier in many categories.

Detoxification Approaches
With regard to established detoxification programs, the Ayurvedic approach has been investigated by more than 600 studies. Most programs include saunas, supplements, massages, and dietary inclusions and restrictions. Research has evaluated the levels of PCBs in patients before and after such a detoxification program, and compared levels to controls. Some techniques have been found very successful at increasing excretion of organotoxins. Many of these steps can be easily included into weight loss programs and provide significant reductions of toxins. Thus it is important that clinicians advising their patients on weight loss assess serum toxin levels prior to beginning a program. Patients with higher levels of these toxins could be advised to add more detoxification protocols to their weight loss program to promote their increased elimination during weight loss.

References
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Home Pesticides Could Make You Fat

By Emily Main

A new study points to a potential effect of pesticides on your weight.

RODALE NEWS, EMMAUS, PA—Among the many dangers of pesticides already known are cancer, non-Hodgkin's lymphoma, and Parkinson's disease. Now you can add obesity and type 2 diabetes to the list. A new study published in the Journal of Medicinal Chemistry finds that a certain class of chemical pesticides used on lawns can influence your body's secretion of insulin, which could have a long-term impact on your waistline.

THE DETAILS: The researchers used human tissue cells to see how they were influenced by two classes of chemicals, phenoxy herbicides and fibrates. Phenoxy herbicides are a large class of chemical pesticides encompassing 2,4-D, the most widely used pesticide in the U.S. and the active ingredient in most "weed and feed" fertilizers and products like Ortho Weed-B-Gone; fibrates are cholesterol-lowering drugs. They found that both phenoxy herbicides and fibrates block the body's receptors of a particular hormone, T1R3, found on your tongue and in your pancreas, that regulates your body's ability to sense sweet tastes. It also influences your body's ability to produce insulin.

The reaction is similar to what might happen if you go on a high-carbohydrate diet, says study coauthor Bedrich Mosinger, MD, PhD, a geneticist and researcher at the Monell Chemical Senses Center in Philadelphia. "High-carb diets stimulate your pancreatic cells, and insulin releases more quickly," he says. That, in turn, lowers your blood sugar and makes you crave, and eat, more food.

"Chronically, when you do that, it depletes the body's ability to produce insulin. Eventually, people cannot make enough insulin to sustain blood glucose levels, and that results in type 2 diabetes."

WHAT IT MEANS: A test-tube study doesn't prove that the same thing would happen in the human body. But the chemical pesticides you use on your lawn may be influencing your body's ability to regulate insulin production, and the potential for it to lead to bigger problems like obesity and type 2 diabetes is very real, says Dr. Mosinger. "Anything that can disturb your body's hormonal regulation can have a significant effect," he says. He's currently studying how these chemicals work on human bodies, not just tissue.


COME BACK TO YOUR ROOTS

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INTRODUCTION

Several pressures have accelerated the search for more environmentally and toxicologically safe and more selective and efficacious pesticides. Most commercially successful pesticides have been discovered by screening compounds synthesized in the laboratory for pesticidal properties. The average number of compounds that must be screened to discover a commercially viable pesticide has increased dramatically, so that new discovery strategies must be considered. Increased emphasis on reduced-tillage agriculture will make adequate control of weeds more dependent on chemical control. New herbicides will be needed to fully meet this challenge. The increasing incidence of pesticide resistance is also fueling the need for new herbicides. Furthermore, most synthetic chemicals that have been commercialized as herbicides are halogenated hydrocarbons with relatively long environmental half-lives and more suspect toxicological properties than most natural compounds. Thus, natural compounds have increasingly become the focus of those interested in discovery of pesticides.

Tens of thousands of secondary products of plants have been identified and there are estimates that hundreds of thousands of these compounds exist. There is growing evidence that most of these compounds are involved in the interaction of plants with other species—primarily the defense of the plant from plant pests. Thus, these secondary compounds represent a large reservoir of chemical structures with biological activity. This resource is largely untapped for use as pesticides. This review will provide an overview of those compounds from plants that have been utilized for pest control, examples of some compounds with pesticidal potential, and a discussion of considerations in development of natural plant compounds for pesticidal use.

PLANT-DERIVED COMPOUNDS WITH PESTICIDAL POTENTIAL

Herbicides

Inhibition of plant growth and production of phytotoxic symptoms by certain plants and their residues is a well-established phenomenon. In searching for potential herbicides from plants, screening of compounds known to function in plant-plant interactions is a logical strategy. All plants produce secondary compounds that are phytotoxic to some degree. However, in only a relatively few cases has it been established that particular compounds provide the producing species a competitive advantage over other species that are less tolerant to the compound. Only a few of these allelochemicals have been actively pursued as herbicides and, in these cases, the natural compound has been modified. A derivative of the terpenoid allelochemical 1,8-cineole (Fig. 1), with the common name of cinmethylin (Fig. 1), is being commercially developed. Toxaphenereg., a mixture of chlorinated camphene derivatives, was sold as a herbicide and an insecticide, but was removed from the market in 1982 by the EPA. Other very weakly phytotoxic compounds from plants such as benzoic acids can be made much more herbicidally active by halogen substitutions. Several benzoic acid derivatives such as dicamba (3,6-dichloro-2-methoxybenzoic acid) are widely used as herbicides.

A few highly phytotoxic plant-produced compounds have been discovered. However, none have been developed as herbicides. The sesquiterpenoid lactone, artemisinin from Artemisia annua L., was found to inhibit plant growth as well as the commercial herbicide cinmethylin. Other compounds, such as 2,4-dihydroxy-1,4-benzoxazin-3-one are as active as plant growth inhibitors as many herbicides. Plants produce many photodynamic compounds, such as hypericin (Fig. 1), that are strongly phytotoxic, provided they...
can be introduced into the plant cell. These compounds are unlikely to be developed as pesticides because, in the presence of light, they are toxic to all living organisms. However, any plant can be caused to generate phytotoxic levels of photodynamic porphyrin compounds by treating the plant with both d-aminolevulinic acid (Fig. 1), a natural porphyrin precursor, and 2,2'-dipyridyl, a synthetic compound.

This relatively safe combination of compounds is being developed as the "laser" herbicide. Several classes of commercial herbicides have recently been shown to act by causing target plant species to accumulate phytotoxic levels of protoporphyrin IX a photodynamic chlorophyll and heme precursor. Thus, a natural product, not the synthetic herbicides is the acutely toxic compound in these cases. Application of protoporphyrin IX alone to plant issues, however, is not effective, apparently because it does not reach the proper cellular compartment in sufficient quantity.

A problem with plant-produced phytotoxins as potential herbicides is that in the native state, they are generally only weakly active compared to commercial herbicides. Most known allelochemicals would have to be applied at rates of more than 10 kg/ha to achieve significant weed control whereas, most recently marketed herbicides would achieve the same level of control at levels three orders of magnitude smaller. This is not unexpected, because production of highly phytotoxic compounds would lead to strong autotoxicity unless the producing plant develops metabolic or physical mechanisms to cope with its own phytotoxins. Some of the more potent allelochemicals are toxic to the producing species and this autotoxicity has been implicated in vegetation shifts. Microbial conversion of relatively non-phytotoxic compounds in the soil to highly phytotoxic derivatives has been documented.

Plants have been much more successfully exploited as sources of pesticides for pests other than weeds. This is probably due to several factors. The selection pressure caused by pathogens and herbivores has probably been more acute and intense than that caused by plant competitors. A plant species can effectively compete with plant foes in many ways other than by poisoning them and having to cope with autotoxicity. Pathogens and herbivores have many potential physiological and biochemical sites of action for pesticides that the plant does not share. Biosynthesis of a compound to affect one of these sites reduces the chance of autotoxicity. Thus, the chemical option is generally a more attractive option in responding to a herbivore or pathogen that can rapidly devour or invade the plant than it is in responding to a plant competitor.

**Insecticides**

Throughout history, plant products have been successfully exploited as insecticides, insect repellents, and insect antifeedants. Probably the most successful use of a plant product as an insecticide is that of the pyrethroids. The insecticidal properties of the several *Chrysanthemum* species were known for centuries in Asia. Even today, powders of the dried flowers of these plants are sold as insecticides. After elucidation of the chemical structures of the six terpenoid esters (pyrethrins) responsible for the insecticidal activity of these plants, many synthetic analogs have been patented and marketed. Synthetic pyrethroids have better photostability and are generally more active than their natural counterparts.

Another plant terpenoid, camphene (Fig. 2), was a very successful herbicide in its polyhalogenated form. Sold as Toxaphrene, this product was the leading insecticide in the United States before it was removed from the market. Although this product was a mixture of over two hundred chlorinated forms of camphene, certain specific compounds in the mixture were found to be much more active than the mixture on a unit weight basis. Many other terpenoids have been demonstrated to have insecticidal or other insect-inhibiting activities. For instance, azadirachtin and other terpenoids of the limonoid group from the families Meliaceae and Rutaceae are potent growth inhibitors of several insect species.

Nicotine (Fig. 2) and nornicotine, components of several members of the genus *Nicotiana*, have been used commercially as insecticides. *N. rustica* is the chief commercial source. Other natural analogues of nicotine have been shown to have significant insecticidal properties and one, anabasine or neonicotine (Fig. 2), has been produced as an insecticide from the shrub, *Anabasis aphylla*, in the Soviet Union. Synthetic variations of nicotine such as 5'-methyl-nornicotine have been demonstrated to be effective insecticides. Ryanodine, an alkaloid from the tropical shrub, *Ryania speciosa*, has been used as a commercial insecticide against European corn borer. Physostigmine, an alkaloid from *Physostigma venenosum* was the compound upon which carbamate insecticides were designed. Furo-quinoine and beta-carboline alkaloids such as dictamine and harmaline, respectively, are potent photosensitizing compounds that are highly toxic to insect larvae in sun light. The relative high cost toxicity to mammals, and limited efficacy have limited the use of natural alkaloid insecticides.

Preparations of roots from the genera *Derris*, *Lonchocarpus*, and *Tephrosia*, containing rotenone (Fig. 2).
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2), were commercial insecticides in the 1930s. Rotenone is a flavonoid derivative that strongly inhibits mitochondrial respiration. No other phenolic compound has been used commercially as an insecticide, although the content of certain phenolic compounds in plant tissues have been correlated with host plant resistance to insects and many have been demonstrated to be strong insect growth inhibitors and antifeedants.

As in plants, delta-aminolevulinic acid (ALA), in combination with 2,2’-dipyridyl, can cause accumulation of toxic levels of photodynamic porphyrin compounds. Larvae of several insect species, when fed these compounds and exposed to light were rapidly killed. Protoporphyrin IX the same compound caused to accumulate in plants by certain photobleaching herbicides, is the prophyrin responsible for the toxicity of these compounds to insects. Other photodynamic compounds from plants such as polyacetylenes are acutely toxic to insects, however, their general toxicity would probably preclude them from commercial use.

Control of insects can be achieved by means other than causing rapid death. Plants produce many compounds that are insect repellents or act to alter insect feeding behavior, growth and development ecdysis (molting), and behavior during mating and oviposition. Most insect repellents are volatile terpenoids such as terpenen-4-ol. Other terpenoids can act as attractants. In some cases, the same terpenoid can repel certain undesirable insects while attracting more beneficial insects. For instance, geraniol will repel houseflies while attracting honey bees. Compounds from many different chemical classes have been reported to act as insect antifeedants. Thus, polygodial a sesquiterpenoid from Polygonum hydropiper, is a potent inhibitor of aphid feeding. Several plant-derived steroids that are close analogues of the insect molting hormone, ecdysterone, prevent insect molting. Other chemically unrelated terpenoids inhibit molting by unknown mechanisms. Plant terpenoids that act as locomotor excitants, biting or piercing suppressants, ovipositioning deterrents, or mating behavior disruptants have been described. More than a dozen plant-produced terpenoid juvenile hormone mimics have been found to effectively sterilize insects. Plants contain a myriad of compounds with potential for commercial development in controlling insects.

Fungicides

Without an immune system to combat pathogenic microorganisms, plants rely primarily on chemical protection with secondary compounds. Compounds that inhibit the establishment of and growth of plant pathogens are termed phytoalexins. Many of these secondary compounds have been chemically characterized and proof is developing that these compounds have such a role in plant disease prevention and control. In fact, there is some evidence that certain synthetic fungicides used in plant protection act by inducing the production of phytoalexins in plants.

Several plant-derived compounds have been demonstrated to be strong elicitors of phytoalexins. For instance, certain oligosaccharide components of cell walls from stressed or dying higher plant cells will act as elicitors. Further knowledge of plant-derived phytoalexin elicitors could lead to their use as fungicides. Several isoflavonoid compounds, such as glyceollin, phaseolin, and pisatin (Fig. 3) in soybean, garden bean, and pea, respectively have been implicated in protection of these crops from pathogens. Many other confirmed or suspected phytoalexins have been identified. Some of these compounds have demonstrated utility against fungi under field conditions. Foliar application of the phenolic lactone juglone (Fig. 3), a product of several walnut species, provides better protection of bean seedlings from rust than some commercial fungicides. Terpenoid phytoalexins) and fungicides are known and some have been tested for commercial efficacy. Wyerone, an acetylenic acid derivative produced by legumes as a phytoalexin has a wide fungicidal spectrum against plant pathogens and has been successfully tested against fungal infection of crop plants. Despite a repertoire of many antifungal and antibacterial compounds, plant products have not been used to any significant extent in the development of antimicrobial pesticides.

Nematicides and Molluscicides

Many plant species are known to be highly resistant to nematodes. The most well-documented of these include marigolds (Tagetes spp.), rattlebox (Crotalaria spectabilis), chrysanthemums (Chrysanthemum spp.), castor bean (Ricinus communis), margosa (Azadiracta indica), and many members of the family Asteraceae (family Compositae). The active principle(s) for this nematicidal activity has not been discovered in all of these examples and no plant-derived products are sold commercially for control of nematodes. In the case of the Asteraceae, the photodynamic compound alpha-terthienyl (Fig. 3) has been shown to account for the strong nematicidal activity of the roots.

The plant-derived saponins are generally highly toxic to snails. Cyanogenic glucosides are responsible for resistance of certain legumes to snails and slugs. No plant-derived natural products are commercial products are available for control of snails and slugs.

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Traditionally, new pesticides have been discovered by synthesis, bioassay, and evaluation. If the compound is sufficiently promising, quantitative structure-activity relationship-based synthesis of analogues is used to optimize desirable pesticidal properties. The discovery process with natural compounds is complicated by several factors.

First, the amount of purification initially conducted is a variable for which there is no general rule. Furthermore, secondary compounds are generally isolated in relatively small amounts compared to the amounts of synthesized chemicals available for screening for pesticide activity. Therefore, bioassays requiring very small amounts of material will be helpful in screening natural products from plants. A number of published methods for assaying small amounts of compounds for pesticidal and biological activities are available in the allelochemical and natural product literature. At some point in the discovery process, structural identification is a requirement. This step can be quite difficult for some natural products. Finally, synthesis of the compound and analogues must be considered. This is generally much more difficult than identification. Despite these difficulties, modern instrumental analysis and improved methods are reducing the difficulty, cost and time involved in each of the above steps.

**Development**

Few pesticides that are found to be highly efficacious in testing are ever brought to market. Many factors must be considered in the decision to develop and market a pesticide. An early consideration is the patentability of the compound. A patent search must be done for natural compounds as with any synthetic compound. Prior publication of the pesticidal properties of a compound could cause patent problems. Compared to synthetic compounds, there is a plethora of published information on the biological activity of natural products. For this reason, patenting synthetic analogues with no mention of the natural source of the chemical family might be safer than patenting the natural product in some situations.

The toxicological and environmental properties of the compound must be considered. Simply because a compound is a natural product does not insure that it is safe. The most toxic mammalian poisons known are natural products and many of these are plant products. Introduction of levels of toxic natural compounds into the environment that would never be found in nature could cause adverse effects. However, evidence is strong that natural products generally have a much shorter half-life in the environment than synthetic pesticides. In fact, the relatively short environmental persistence of natural products may be a problem, because most pesticides must have some residual activity in order to be effective. As with pyrethroids,
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chemical modification can increase persistence.

After promising biological activity is discovered, extraction of larger amounts of the compound for more extensive bioassays can be considered. Also, analogues of the compound should be made by chemical alteration of the compound and/or chemical synthesis. Structural manipulation could lead to improvement of activity, toxicological properties, altered environmental effects, or discovery of an active compound that can be economically synthesized. This has been the case with several natural compounds that have been used as a template for commercial pesticides (e.g., pyrethroids).

Before a decision is made to produce a natural pesticide for commercial use, the most cost-effective means of production must be found. Although this is a crucial question in considering the development of any pesticide, it is even more complex and critical with natural products. Historically, preparations of crude natural product mixtures have been used as pesticides. However, the potential problems in clearing a complex mixture of many biologically active compounds for use by the public may be prohibitive in today's regulatory climate. Thus, the question that will most probably be considered is whether the pure compound will be produced by biosynthesis and purification or by traditional chemical synthesis.

Before considering any other factors, there are two advantages to the pesticide industry to industrial synthesis. They have invested heavily in personnel and facilities for this approach. Changing this approach may be difficult for personnel trained in disciplines geared to use it. Secondly, in addition to the patent for use, patents for chemical synthesis often further protect the investment that a company makes in development of a pesticide.

However, many natural products are so complex that the cost of chemical synthesis would be prohibitive. Even so, more economically synthesized analogues with adequate or even superior biological activity may tip the balance toward industrial synthesis. If not biosynthesis must be considered. There are a growing number of biosynthetic options.

The simplest method is to extract the compound from field-grown plants. To optimize production, the species and the variety of that species that produce the highest levels of the compound must be selected and grown under conditions that will optimize their biosynthetic capacity to produce the compound. Genetically manipulating the producing plants by classical or biotechnological methods could also increase production of some secondary products. For instance, low doses of diphenyl ether herbicides can cause massive increases in phytoalexins in a variety of crop species.

Another alternative is to produce the compound in tissue or cell culture. With these methods, cell lines that produce higher levels of the compound can be rapidly selected. However, genetic stability of such traits has been a problem in cell culture production of secondary products. Cells that produce and accumulate massive amounts of possibly autotoxic secondary compounds are obviously at a metabolic disadvantage and are thus selected against under many cell or tissue culture conditions. A technique, such as an immobilized cell column that continuously removes secondary products can increase production by decreasing feedback inhibition of synthesis, reducing autotoxicity, and possibly increasing generic stability. Other culture methods that optimize production can also be utilized. For instance, supplying inexpensively synthesized metabolic precursors can greatly enhance biosynthesis of many secondary products. Also, plant growth regulators, elicitors, and metabolic blockers can be used to increase production.

Genetic engineering and biotechnology may allow for the production of plant-derived secondary products by gene transfer to microorganisms and production by fermentation. This concept is attractive because of the existing fermentation technology for production of secondary products. However, it may be prohibitively difficult for complex secondary products in which several genes control the conversion of several complex intermediates to the desired product.

Genetic engineering might also be used to insert the genetic information for production of plant-produced pesticides from one plant species to another species to be protected from pests. However, such transgenic manipulation of the complex metabolism of a higher plant might be extremely difficult. A simpler alternative might be to infect plant-colonizing microbes with the desired genetic machinery to produce the natural pesticide, as has been done with bacterial-produced insecticides.

THE FUTURE

Plants contain a virtually untapped reservoir of pesticides that can be used directly or as templates for synthetic pesticides. Numerous factors have increased the interest of the pesticide industry and the pesticide market in this source of natural products as pesticides. These include diminishing returns with traditional pesticide discovery methods, increased environmental and toxicological concerns with synthetic pesticides, and the high level of reliance of modern agriculture on pesticides. Despite the
Continued from page 87 – Natural Pesticides from Plants

Although it may have been a relatively small amount of previous effort in development of plant-derived compounds as pesticides, they have made a large impact in the area of insecticides. Minor successes can be found as herbicides, nematicides, rodenticides, fungicides, and molluscicides. The number of options that must be considered in the discovery and development of a natural product as a pesticide is larger than for a synthetic pesticide. Furthermore, the molecular complexity of many biocides from plants, compared to synthetic pesticides, are discouraging. However, advances in chemical and biotechnology are increasing the speed and ease with which man can discover and develop secondary compounds of plants as pesticides. These advances, combined with increasing need and environmental pressure, are greatly increasing the interest in plant products as pesticides.

Fig. 1. Some plant-produced compounds and derivatives with herbicidal activity. I-1,8-cineole, II-cinmethylin, III-hypericin, IV-delta-aminolevulinic acid.

Fig. 2. Some plant-produced compounds with insecticidal activity. I-camphene, II-nicotine, III-anabasine, IV-rotenone.

Fig. 3. Some plant-produced compounds with fungicidal nematicidal and rodenticidal activity. I-pisatin II-juglone, III-alpha-terthienyl, IV-strychnine.

SYNTHETIC

\[
\text{synthesis} \rightarrow \text{bioassay}
\]

\[
\text{QSAR} \rightarrow \text{evaluation}
\]

NATURAL PRODUCTS

\[
\text{extraction} \rightarrow \text{microbioassay} \rightarrow \text{evaluation}
\]

\[
\text{purification?} \rightarrow \text{further purification?} \rightarrow \text{bioassay}
\]

\[
\text{Identification} \rightarrow \text{synthesis and QSAR}
\]

Fig. 4. Pesticide discovery strategies for synthetic versus natural products.

REFERENCES


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"What we're finding is that the sweet receptors on your tongue are also on many endocrine cells," he says, and these endocrine cells play a large part in how your body regulates hormones, including insulin and thyroid hormones that influence weight.

Used to some degree in agriculture on wheat and rice crops, 2,4-D and other phenoxy herbicides are more widely used on lawns and gardens, where they wash off into storm drains and eventually into rivers and streams that feed drinking-water supplies. As with most pharmaceuticals, fibrates end up in water after they pass through your system and go down the toilet. "Many of these herbicides and fibrates are not removed by water treatment," Dr. Mosinger says. Studies have also found that 2,4-D can blow into homes and linger in household dust that you inhale. "The concentrations that are currently in the environment are in the parts-per-billion range, not extremely high," he says, adding that the concentrations at which long-term damage can be done are unknown at this point. "An acute exposure probably would not make that much of a difference," he says, "but chronic exposure can have an impact on type 2 diabetes."

Used to some degree in agriculture on wheat and rice crops, 2,4-D and other phenoxy herbicides are more widely used on lawns and gardens, where they wash off into storm drains and eventually into rivers and streams that feed drinking-water supplies. As with most pharmaceuticals, fibrates end up in water after they pass through your system and go down the toilet. "Many of these herbicides and fibrates are not removed by water treatment," Dr. Mosinger says. Studies have also found that 2,4-D can blow into homes and linger in household dust that you inhale. "The concentrations that are currently in the environment are in the parts-per-billion range, not extremely high," he says, adding that the concentrations at which long-term damage can be done are unknown at this point. "An acute exposure probably would not make that much of a difference," he says, "but chronic exposure can have an impact on type 2 diabetes."
Protect yourself and your blood sugar levels by taking a few steps to limit your exposure:

- **Get a water filter.** Standard faucet-mount or pitcher filters that use carbon or charcoal are sufficient to remove 2,4-D from your water. There's some evidence that they also remove pharmaceuticals, such as fibrates, although their effectiveness on those compounds isn't fully known at this point.

- **Switch to organic lawn care.** Weed control doesn't require dousing your grass with pesticides. In fact, your weeds are probably trying to tell you about a problem you can fix without toxic chemicals. For instance, clover is a sign that your lawn is too low in nitrogen, and brown grass means you're mowing too much, not that it needs more fertilizer. For other organic solutions, check out our story on chemical-free fixes for common lawn problems. http://www.rodale.com/dangers-pesticides?

**Natural Pesticide Alternatives**

Natural pesticide alternatives. Realize the hazards associated with the use of Pesticides. Learn about natural alternatives to pest control that really work.

Pest control is an ongoing problem for all of us. For years, we have depended on the use of pesticides to eliminate unwanted pest. Pesticides are harmful chemicals that have been linked to illness and disease. Think about it, each time you use a pesticide, some of it will be consumed by you. When we spray a pesticide, small particles are released in the air, making their way to our lungs. When farmers spray crops, the pesticides enter the soil and water. We eat plants that grow in this soil. We eat the fish that live in the waters, and the animals that feed from the plants and drink from polluted lakes and streams. Health and environmental professionals are concerned with the long term effects of pesticide use.

Many forms of illness long term effects of pesticide use. Many forms of illness and disease are linked to pesticides, including cancer. There are some natural alternatives to the use of pest control. If these are used on a continuous basis, they can be very effective for the home. Here are a few suggestions:

1. **Cockroaches:** These have to be the worst. Don't you hate opening the cabinet and seeing several cockroaches scurrying across your dishes? For me, this results in an instant 'LOSS OF APPETITE'! These little devils scamper, hurriedly throughout our home, infesting every thing they touch. What's frightening, is seeing little tiny babies, then you know they are reproducing, multiplying, and taking up homestead in your home. They could easily be labeled, the peskiest pest of all. The key is to block the cockroach's point of entry. Prepare your home against cockroach invasion. Fill in all cracks around baseboards, cabinets, shelves, sinks, bathtubs, and in pipes. Sprinkle Borax around each point of entry. Borax is a crystalline salt used to manufacture detergents and soaps. It is also used as a water softener and mild antiseptic. Borax has been proven to be very effective against cockroaches.

2. **Ants:** It should not be difficult to locate the ants' point of entry. They will be in a line formation, resembling an army of soldiers marching off to war. These little soldiers are dedicated, hard working, and find their strength in great numbers. They are persistent, but can be forced to turn and retreat. You have several options of combat weapons to use. Try sprinkling talcum powder in the area of entry; you can also use cayenne pepper, damp coffee grounds, bone meal, charcoal, or chalk. Another strategy is to squeeze lemon juice in this area, and leave the lemon peeling behind. Ants may have the reputation of being honorable soldiers, but watch them turn and flee. Oh the shame, of leaving your fellow soldiers on the battle field to die alone. But don't you feel proud. You have accepted the challenge, defeated the enemy, and just think you didn't even have to engage in chemical warfare.

3. **Flies:** There's nothing more refreshing then awakening to a bright, sunny, morning, flinging open the windows, and smelling the crisp, morning air. A perfect day for a family picnic, and the favorite time for the fly to take to the air and explore. A fly simply cannot resist an open, sunny, window. Before you get the coffee brewing and the bacon frying, you have a kitchen full of flies, landing on every utensil and morsel of food they can find. What do you do? You pull out the trusty, old, fly swat and go about the kitchen swatting frantically, in a fit of fury. By the time the husband and the kids awaken, you are as ill and short-tempered as a hornet. Hence, the ruining of a perfect day. This could all have been avoided by just keeping the windows closed. Another trick is to try honey on yellow paper. The fly will be attracted to the honey, land and stick, never to fly again. So, hang up your fly swat, keep the windows closed, try a little honey, and greet your family with a smile each new day.

4. **Ticks and Fleas:** Ticks and fleas usually enter the home, by way of the family pet. A pet loves and should be able to spend time in the home, interacting with the family. Ticks and fleas can make your pet miserable, and are certainly unwanted in the home environment.

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Continued from page 89 - Natural Pesticide Alternatives

The approach must be directed at keeping the pet free of pest. A routine bath should do the trick, with a little help from an herbal rinse you can prepare. It's simple, bring two pints of water to a boil, add two tablespoons of Rosemary, and let soak twenty minutes. Drain and allow cooling. Wash the pet with soap and warm water. Towel dry the coat, then apply the herbal rinse. Apply this to the pet with a spray bottle or sponge, do not rinse or towel dry. Let this dry thoroughly, on its own. Please do not let the pet go outdoors until the coat is dry. If this is done on a continuous basis, you should not have a problem with ticks and fleas. Your pet, and your family, will be happy with the results.

Be aware of the risk and hazards, related to Pesticides. Try these suggestions for natural alternatives, and protect the health of yourself, and your family.


Introduction to Citronella Oil:

Citronella oil is a volatile oil which is distilled using steam from the greenish blue, lemon-scented leaves and stem of the plant Cymbopogon nardus (Ceylon citronella) or Cymbopogon winteratus (Java type citronella) and the main constituents being citronellal and geraniol. In trade, citronella oil is categorised into two types:

1) Ceylon citronella oil - obtained from Cymbopogon nardus Rendle, (inferior type)
2) Java citronella oil - obtained from Cymbopogon winterianus Jowitt, (superior type)

The Ceylon citronella oil was the more widely produced citronella oil, until the beginning of this century. However, the Java citronella oil slowly began to show dominance in the market because of its higher yield of oil.

Characteristics Of Citronella Oil:

Citronella oil is a colourless or light yellow liquid with a characteristic woody, grassy or lemony odour. It is flammable and if the vapours are inhaled, this could cause an initial stimulation followed by depression of the central nervous system.

Citronella oil may be harmful if ingested in quantity and may irritate the skin and eye. However, it is not believed to be hazardous to humans, including children and those with sensitive skin, if used according to label instructions. Citronella oil has been widely used since the 1950s without any adverse effects which may cause concern.

Citronella oil has minimal or no risk to wildlife and environment due to its toxic levels being low and its use being limited. Therefore, it can be used around the home with no expected adverse effects.

The fumes of citronella oil are said to be potentially toxic to birds; however, this is because it is often used in conjunction with other essential oils in air fresheners – therefore, the potential to cause toxicity.

Uses Of Citronella Oil:

1) Insect repellent:
Citronella oil repels insects such as mosquitoes, black flies, fleas and ticks, therefore, preventing its bites. It is used on humans and their clothing – in the form of an oil, liquid and patch. Citronella oil is a natural, non-toxic alternative to chemical insect repellents such as DEET, therefore, is usually the preferred choice. Also available are solid products such as citronella oil insect repelling candles and cartridges. Citronella oil is also used in a tablet or pellet form in recreational or outdoor household areas and around trees and shrubs. In addition, there are animal collars and tags containing citronella oil for pets and other domestic animals to repel fleas. A combination of the citronella oil and cedarwood virginian oil also helps to repel mosquitoes.

2) Aromatherapy:
Citronella oil, an essential oil, possesses activating and warming qualities both physically and mentally. The aroma is said to be like its relatives lemongrass and palmarosa. However, citronella oil is overlooked in aromatherapy because of its association with insect repellency. When citronella oil is diluted properly in a base oil and is applied to skin, it produces a mild sensation of warmth – which relieves painful muscles and joints. Mentally, the aroma of citronella oil may help with nervous fatigue due to its clarifying properties. It can also ease pressure of migraines and headaches. Citronella oil blends well with cedarwood, orange, geranium, lemon and bergamot - however, you should only use essential oils under those specialised in the field. It is safer to consult a qualified aromatherapist if ever in doubt.

3) Astringent:
Citronella oil is an astringent and if used correctly it may help with oily skin areas. Use a single drop of citronella oil on the skin (usually inner forearm) to test for irritation.

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Because the pyrethrum mammalian toxicity is very low, it can be applied to food crops close to harvest. Pyrethrum has high contact toxicity for common beneficial insects.

Garlic is marketed in several products intended to repel insects, much as capsaicin does. Products are labeled to repel a wide variety of pests on ornamental plants, but garlic may also repel beneficial insects. To date there is little research showing effectiveness of garlic insecticides.

Rottenone is one of the most toxic of the commonly-used botanical insecticides. Rottenone acts as a nervous system poison. It is highly toxic to fish and other aquatic life and is commonly used as a fish poison. Rottenone can be toxic to mammals through inhalation and may cause skin irritation. Rottenone will also kill many beneficial insects and should only be used to control severe insect infestations. In most cases, other, safer pesticides should be used in preference to rottenone.

Sabadilla & Ryania are older botanical insecticides that are rarely available. No sabadilla or ryania products could be found that are currently registered for use in South Carolina.

Nicotine derived from tobacco, is one of the most toxic botanicals. It is a fast-acting nerve toxin and is highly toxic to mammals. It is easily absorbed through the eyes, skin, and mucous membranes. Because of its high toxicity it is no longer registered for use as a pesticide. Home brewed nicotine preparations can also be quite toxic. Less harmful products will produce equal results.

Essential Oils
A variety of pesticides based on essential oils or components of essential oils have come on the market in the last few years. Essential oils are volatile, highly concentrated substances extracted from plant parts. In 1996 the EPA established that certain ingredients that pose minimum risk to users no longer require EPA approval to be marketed as insecticides. A number of these ingredients are essential oils, including the oils of cedar, cinnamon, citronella, citrus, clove, eugenol (a component of clove oil), garlic, mints, rosemary, and several others. As insecticides, these work most commonly as contact killing agents only, so re-treatment may be needed. Most essential oils used as pesticides work by disrupting an insect neurotransmitter that is not present in people, pets, or other vertebrates.

Eugenol is a component of clove oil. It is a fast acting contact insecticide that is effective on a wide variety of household pests such as cockroaches, ants, dust mites,
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flies, wasps, spiders, crickets, and fleas. It is also used on some ornamental plant pests such as armyworms, thrips, aphids and mites.

Eugenol has little or no residual activity, although the scent of cloves will linger. Products based on eugenol are considered minimum risk pesticides with very low risk of damage to the environment or user. Internet

Continued from page 3 - Tombs of Buganda Kings at Kasubi

spiritual values. The site is a major spiritual centre for the Baganda and is the most active religious place in the kingdom. The structures and the traditional practices that are associated with the site are one of the exceptional representations of the African culture that depict a continuity of a living tradition. The site's main significance lies in its intangible values of beliefs, spirituality, continuity and identity of the Baganda people. The site serves as an important historical and cultural symbol for Uganda and East Africa as a whole.

Criterion (i): The Kasubi Tombs site is a master piece of human creativity both in its conception and its execution.

Criterion (iii): The Kasubi Tombs site bears eloquent witness to the living cultural traditions of the Baganda.

Criterion (iv): The spatial organization of the Kasubi Tombs site represents the best extant example of a Baganda palace/architectural ensemble. Built in the finest traditions of Ganda architecture and palace design, it reflects technical achievements developed over many centuries.

Criterion (vi): The built and natural elements of the Kasubi Tombs site are charged with historical, traditional, and spiritual values. It is a major spiritual centre for the Baganda and is the most active religious place in the kingdom.

Integrity (2010)
The boundary of the land on which the tombs are located is clearly marked with the traditional bark cloth tree (Ficus sp.) and coincides with the 1882 traditional boundary. The live markers have been useful in keeping away land encroachers for housing construction and other developments, thus maintaining the original land size. The architectural palace design that comprise of the placement of the buildings, and tombs/grave yards of members of the royal family around the Muzibu-Azaala-Mpanga reflecting the traditional palace structure is still being maintained in its original ensemble.

Although the recent fire tragedy, that destroyed the main tomb building, means that one key attribute is now missing, the cultural traditions associated with building in poles, spear grass, reeds and wattle are still vibrant and will allow the recreation of this tomb building.

The other traditional structures are still in place and the key attributes related to traditional ceremonial and religious practices and land tenure and land use practices are still being maintained.

Authenticity (2010)
The authenticity of the Tombs of the Kings of Buganda at Kasubi is reflected in the continuity of the traditional and cultural practices that are associated with the site. The original burial system of the Kabakas of Buganda is still being maintained. The placement of Muzibu-Azaala- Mpanga in the middle of other buildings around the large central courtyard (Olugya), with a forecourt containing the drum house and entry gate house, are a typical ensemble of the Buganda Kingdom palace. The practice of using grass thatched roof resting on structural rings of palm tree fronds is still being maintained as well as the internal elements and finishing materials such as the long wooden poles wrapped in bark cloth decoration. Although the authenticity of the site has been weakened by the loss to the fire of the main tomb structure, the building's traditional architectural craftsmanship and the required skills are still available to allow it to be recreated. This factor, coupled with the extensive documentation of the building, will allow an authentic renewal of this key attribute.

Protection and management requirements (2010)
Managed by the Buganda Kingdom, the property was gazetted a protected site under Statutory Instrument No. 163 of 1972 and under Historical Monument Act (Act 22 of 1967). This legal status was further strengthened by the National Constitution (1995). The Historical Monument Act protects the Kasubi Tombs from residential encroachment or any other purpose inconsistent with its character. The land that hosts the Tombs is titled under the Land Act (1998). The land title is registered in trust of the Kabaka (King) on behalf of the Kingdom.

The protection of the site is further strengthened by the various Tourism Policies of Uganda. The site has an approved General Management Plan (2009 - 2015). A Site Manager is in place.

The greatest threat to the site is fire. There is a need to develop a detailed Risk Management Plan to address this threat, in particular, and to ensure that site documented is as complete as possible and securely stored.

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In order to ensure that the traditional building processes associated with the site are maintained over time, there is an on-going need to train young educated people.

There is a need to ensure that the principles guiding the recreation of the main tomb building are agreed by all the key stakeholders - the UNESCO World Heritage Committee, the Buganda Kingdom and the Government of the Republic of Uganda, and that the process of recreating the building is systematic, based on evidence and adequately recorded.

**Long Description**
The Kasubi site bears eloquent witness to the living cultural traditions of the Baganda. The spatial organization of the Tombs represents the best extant example of a Baganda palace/architectural ensemble. Built in the finest traditions of Ganda architecture and palace design, it reflects technical achievements developed over many centuries. The built and natural elements of the tombs are charged with historical, traditional, and spiritual values. It is a major spiritual centre for the Baganda and is the most active religious place in the kingdom.

The Baganda belong to the Bantu-speaking people and date their political civilization from about the 13th century AD. Today, the Baganda are the major ethnic group in Uganda. The present tomb structure dates to around 1882. Muteesa I became a very powerful Kabaka, the first to be influenced by foreign cultures. He adopted some Islamic religious practices learnt from ivory and slave traders from Zanzibar. He also showed interest in Europe after acting as host in 1862 to John Hanning Speke, the first European visitor. Some surviving artefacts reflect this pivotal period in local history when the Baganda were first exposed to Arab traders and European explorers.

When Muteesa Ist died in 1884 he was buried in his palace, Kasubi, establishing Kasubi as an important burial place of the Kabakas of Buganda. After independence in 1962 Muteesa II became president, with his own prime minister. Kasubi was stormed in 1966 and the president went into exile, but when he died in 1969 his remains were returned and buried at Kasubi in 1971. Four successive Kabakas of Buganda were therefore buried in the same tomb house at Kasubi, the building which is at the core of this World Heritage site. Each prince and princess who is a descendant of the four Kabakas is also buried there behind the main shrine.

Kabaka Ronald Mutebi II was crowned as the Kabaka of Buganda, and in 1997 the Kasubi tombs were returned to the Buganda kingdom. Buganda is today one of four kingdoms in Uganda.

The Kasubi Tombs site is situated on a hill within Kampala. It consists of three main zones: the main tomb area, located at the western end of the site on top of the hill; an area located behind the main tombs containing a number of buildings and graveyards; and a large area on the eastern side of the site used primarily for agricultural purposes.

The structure was constructed of wooden columns and invisible walls of fired brick. Beyond is a small courtyard containing a circular building with the royal drums.

The D-shaped main courtyard (Olugya) lies through a gap in a reed fence. This fence encloses the courtyard and links nine buildings, five of them houses for the widows of the Kabakas, the other four respectively a twins' house, two tombs, and a mortuary.

Beyond the Olugya is scattered a large number of buildings - houses, royal tombs and ones for agricultural purposes - and a royal cemetery. The whole area is sacred and is not open to visitors.

Since 1938 the building has suffered several processes of restoration and modification, primarily to meet threats of structural failure. It was completely reconstructed in 1938-40, when modern materials were introduced, such as some concrete columns. During the 1990s, changes incurred by most of the buildings have slightly changed the architectural value of the site; which suffers badly from rain, drainage problems, and termites, with a constant threat of fire.

Most of the smaller buildings show deficiencies. One building burnt down in 1998 has been rebuilt but is without a thatch roof for lack of funds. The original reed fence around the whole site has long since disappeared; the living fence of bark-cloth trees around the site has suffered quite badly as an obvious target in the endless search for firewood. The site has, nevertheless, to an extent been preserved out of fear and respect for its sacred and religious nature. Source: UNESCO/CLT/WHC

**Historical Description**
The Baganda belong to the Bantu-speaking people and date their political civilization from about the 13th century AD. Today, the Baganda are the major ethnic group in Uganda, their 6 million people constituting about 28% of the population. The Buganda region covers about 66,350km². From Kintu, the first legendary Kabaka, to Muteesa I there were 35 Kabakas. Precise
dates, however, are known only from Suuna II (1836-56), who established his palace at Kasubi. He was succeeded by his son Muteesa I who did likewise, constructing the present tomb structure as his palace in 1882. He became a very powerful Kabaka, the first to be influenced by foreign cultures. He adopted some Islamic religious practices learnt from ivory and slave traders from Zanzibar. He also showed interest in Europe after acting as host in 1862 to John Hanning Speke, the first European visitor. In 1875 he asked Henry Morton Stanley, the explorer, for teachers of European learning and religion. Some remaining artefacts reflect this pivotal period in local history when the Baganda were first exposed to Arab traders and European explorers.

When Muteesa I died in 1884, he broke two traditions: his body was buried whole and it was buried in his palace, Kasubi, not somewhere else. This practice was followed when, in 1910, the remains of his successor, Mwanga II (ob. 1903), were brought back from the Seychelles and also buried there, establishing Kasubi as an important burial place of the Kabakas of Buganda. This status was reinforced when his son and successor, Daudi Chwa II, died in 1939 and was also buried at Kasubi.

His son and successor, Edward Muteesa II, was first in conflict with Britain and then, after independence in 1962 when he became President, with his own Prime Minister. Kasubi was stormed in 1966 and the President went into exile, but when he died in 1969 his remains were returned and buried at Kasubi in 1971. Four successive Kabakas of Buganda were therefore buried in the same tomb house at Kasubi, the building which is at the core of this nomination. Each prince and princess who is a descendant of the four Kabakas is also buried there behind the main shrine.

Between 1967 and 1993 the site was controlled by central government, but the traditional institutions of kingship were restored in 1993. Kabaka Ronald Mutebi II was crowned as the Kabaka of Buganda, and in 1997 the Kasubi tombs were returned to the Buganda kingdom. Buganda is today one of four kingdoms in Uganda. The site is now not only the most important cultural shrine for the Baganda but also the most attractive tourist site in the country.

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COME BACK TO YOUR ROOTS

**SUFFIX “Cide” – TO KILL**

We are the only species on this planet that knowingly or unknowingly commit suicide and knowingly commit genocide. We are creatures of melanin; a living molecule that can protects us from the environment to a certain extent. Pesticides and insecticides are designed have an “affinity for” or to attack melanin in pests and insects. But doesn’t this also lead to an attack on the melanin inherent in humans and animals. When our melanin becomes toxic, we have reached our body burden of dangerous chemicals. When melanin becomes toxic, there is no barrier to disease. The idea, of incorporating a man-made pesticide in living plants so that damage from insects will not affect the monetary value of our crops, having no regard for people or animals that are forced to eat this garbage, is to risk our health for corporate greed. It does seem a bit farfetched doesn’t it? Is it greed that has doomed humanity? This is genocidal. There are many pleasures in life. Eating good food is one of them. We must eat to exist. But does it mean we will eat anything? This is suicidal. Africa is now posed to use DDT, the granddaddy of all poisonous pesticides to eliminate malaria. It behooves us to understand why when we have a treasure trove of organic herbs and plants that can be used in malarial control. It only takes a little research, people. This is what we are seeing. We are a diseased species. We are suffering from digestive and heart diseases, high blood pressure, diabetes, obesity, cancer, infertility, autism, neurological, respiratory, kidney and reproductive diseases, gender changes, pollution in our waters, our soil, the air we breathe, killing bees and contributing to the loss in biodiversity. Did we know we would be hurting ourselves? We know now. The answer is not more “icides”, but less. To be greedy you must be selfish. Everything has its degrees, its limitations, and its aspirations. The idea to make our harvests free of insect damage so we can feed a more populous world was good in a very naïve way, but this idea has been hijacked for other ideas of world domination. The idea was good but the means is terrible. We must “stand our ground” against corporate greed, callousness and these genocidal tendencies to kill every man, woman and child on the planet. It is up to us to stop it. “The black man shall not be a creature of the past, but a full-fledged man of the present and a power to be reckoned with in the future.” Marcus Garvey

Blackherbals – A Marcus Garvey Pan-African University’s Community Site of Knowledge
Botanical insecticides are naturally occurring toxins extracted from plants. There are several advantages to using botanical rather than synthetic insecticides. Plant derived insecticides breakdown quickly in the environment, resulting in little risk of residues on food crops and less risk to beneficial insects. Some materials can be used shortly before harvest. Most botanicals are rapid acting and most, but not all botanicals are of low to moderate toxicity to mammals. Because most botanical insecticides must be eaten by the insect pest, they are primarily harmful to these pests and do little harm to beneficial insects.

There can also be disadvantages to using these products. Rapid break down, while less risky to health and environment, often creates a need for precise timing or more frequent applications. Several botanical insecticides are quite toxic and should be handled accordingly. Some botanical insecticides can be difficult to find in local stores.

Neem is a relatively new and promising botanical insecticide made from extracts of Neem tree seeds. It is used to control a wide variety of insects including leafminers, whiteflies, thrips, caterpillars, aphids, mealybugs, spider mites, scale crawlers, and beetles. Neem is most effective against actively growing immature insects.

Azadirachtin, the active ingredient in neem extracts, has a very low mammalian toxicity. It acts as an insect feeding deterrent and growth regulator. Neem does not produce a quick knockdown and kill, but stops insect feeding. The treated insect usually cannot molt into its next life stage and dies without reproducing.

Many commercial neem products exist, including Azatin XL, Neemix, SouthernAg Triple Action Neem Oil and Safer BioNeem. These products are labeled for use on ornamentals, foliage plants, trees, shrubs and food crops. Many neem products and formulations are also effective as a fungicide against powdery mildew.

Limonene (also known as d-Limonene) is produced from citrus oils extracted from oranges and other citrus fruit peels. It is used as a contact insecticide against ants, roaches, palmetto bugs, fleas, silverfish and many

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