

Bathed in Pesticides: the Narrative of Deception

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The volume of pesticide use and exposure is occurring on a scale that is without precedent and world-historical in nature. Agrichemicals are now pervasive as they cycle through bodies and environments. The herbicide glyphosate has been a major factor in driving this increase in use.

These statements appear in a 2021 paper '[Growing Agrichemical Ubiquity: New Questions for Environments and Health](#)' (Community of Excellence in Global Health Equity).

The authors state that when the WHO's International Agency for Research on Cancer (IARC) declared glyphosate to be a "probable carcinogen" in 2015, the fragile consensus about its safety was upended.

They note that in 2020 the US Environmental Protection Agency affirmed that glyphosate-based herbicides (GBHs) pose no risk to human health, apparently disregarding new evidence about the link between glyphosate and non-Hodgkin's lymphoma as well as its non-cancer impacts on the liver, kidney and gastrointestinal system.

The multi-authored paper notes:

In just under 20 years, much of the Earth has been coated with glyphosate, in many places layering on already chemical-laden human bodies, other organisms and environments."

However, the authors add that glyphosate is not the only pesticide to achieve broad-scale pervasiveness:

The insecticide imidacloprid, for example, coats the majority of US maize seed, making it the most widely used insecticide in US history. Between just 2003 and 2009, sales of imidacloprid products rose 245% (Simon-Delso et al. 2015). The scale of such use, and its overlapping effects on bodies and environments, have yet to be fully reckoned with, especially outside of countries with relatively strong regulatory and monitoring capacities.”

According to Phillips McDougall’s Annual Agriservice Reports, herbicides made up 43% of the global pesticide market in 2019 by value. Much of the increase in glyphosate use is due to the introduction of glyphosate-tolerant soybean, maize, and cotton seeds in the US, Brazil and Argentina.

The global pesticide industry is valued at over \$50 billion (Phillips McDougal 2018).

Eating Poison

In December 2021, a piece appeared in the prominent Danish newspaper Weekendavisen. Written by Niels Bjerre, agricultural affairs manager at Bayer CropScience in Copenhagen, ‘Thank goodness for pesticides’ set out to convince readers that sustainable modern agriculture cannot be done without using pesticides.

Denmark-based environmental campaigner Rosemary Mason has responded with the document ‘[Open Letter to Bayer: Monsanto concealed the toxicity of Roundup to human health and the environment](#)’ which mentions but goes beyond the now well-documented duplicity of Monsanto (which Bayer bought in 2018) – see the ‘[Monsanto Papers](#)’ – to highlight the ongoing damage being done by pesticides like glyphosate.

Mason lists many pertinent studies. For instance, a [French](#)

[team](#) has found heavy metals in chemical formulants of GBHs in people's diets. As with other pesticides, 10–20% of GBHs consist of chemical formulants. Families of petroleum-based oxidized molecules and other contaminants have been identified as well as the heavy metals arsenic, chromium, cobalt, lead and nickel, which are known to be toxic and endocrine disruptors.

In 1988, Ridley and Mirly (commissioned by Monsanto) found bioaccumulation of glyphosate in rat tissues. Residues were present in bone, marrow, blood and glands including the thyroid, testes and ovaries, as well as major organs, including the heart, liver, lungs, kidneys, spleen and stomach. Glyphosate was also associated with ophthalmic degenerative lens changes.

A Stout and Rueker (1990) study (also commissioned by Monsanto) provided concerning evidence with regard to cataracts following glyphosate exposure in rats. It is interesting to note that [the rate of cataract surgery in England](#) "increased very substantially" between 1989 and 2004: from 173 (1989) to 637 (2004) episodes per 100,000 population.

A 2016 study by the WHO also confirmed that the incidence of cataracts had greatly increased: 'A global assessment of the burden of disease from environmental risks' says that cataracts are the leading cause of blindness worldwide. Globally, cataracts are responsible for 51% of blindness. In the US, between 2000 and 2010 the number of cases of cataract rose by 20% from 20.5 million to 24.4 million. It is projected that by 2050, the number of people with cataracts will have doubled to 50 million.

The authors of 'Assessment of Glyphosate Induced Epigenetic Transgenerational Inheritance of Pathologies and Sperm Epimutations: Generational Toxicology' (Scientific Reports, 2019) noted that ancestral environmental exposures to a variety of factors and toxicants promoted the epigenetic

transgenerational inheritance of adult-onset disease.

They proposed that glyphosate can induce the transgenerational inheritance of disease and germline (for example, sperm) epimutations. Observations suggest the generational toxicology of glyphosate needs to be considered in the disease etiology of future generations.

In a 2017 study, Carlos Javier Baier and colleagues documented behavioural impairments following repeated intranasal glyphosate-based herbicide administration in mice. Intranasal GBH caused behavioural disorders, decreased locomotor activity, induced an anxiogenic behaviour and produced memory deficit.

The paper contains references to many studies from around the world that confirm GBHs are damaging to the development of the foetal brain and that repeated exposure is toxic to the adult human brain and may result in alterations in locomotor activity, feelings of anxiety and memory impairment.

Highlights of a [2018 study](#) on neurotransmitter changes in rat brain regions following glyphosate exposure include neurotoxicity in rats. And in a 2014 study which examined mechanisms underlying the neurotoxicity induced by glyphosate-based herbicide in the immature rat hippocampus, it was found that Monsanto's glyphosate-based Roundup induces various neurotoxic processes.

In the paper 'Glyphosate damages blood-testis barrier via NOX1-triggered oxidative stress in rats: Long-term exposure as a potential risk for male reproductive health' (Environment International, 2022) it was noted that glyphosate causes blood-testis barrier (BTB) damage and low-quality sperm and that glyphosate-induced BTB injury contributes to sperm quality decrease.

The study [Multiomics reveal non-alcoholic fatty liver disease in rats following chronic exposure to an ultra-low dose of](#)

[Roundup herbicide](#) (2017), revealed non-fatty acid liver disease (NFALD) in rats following chronic exposure to an ultra-low dose of Roundup herbicide. NFALD currently affects 25% of the US population and similar numbers of Europeans.

The 2020 paper 'Glyphosate exposure exacerbates the dopaminergic neurotoxicity in the mouse brain after repeated of MPTP' suggests that glyphosate may be an environmental risk factor for Parkinson's.

In the 2019 Ramazzini Institute's 13-week pilot study that looked into the effects of GBHs on development and the endocrine system, it was demonstrated that GBHs exposure, from prenatal period to adulthood, induced endocrine effects and altered reproductive developmental parameters in male and female rats.

Aside from glyphosate, Mason also notes that in 1991 Bayer CropScience introduced a new type of insecticide into the US: imidacloprid, the first member of a group now known as neonicotinoids.

Imidacloprid was licensed for use in Europe in 1994. In July of that year, beekeepers in France noticed something unexpected. Just after the sunflowers had bloomed, a substantial number of their hives would collapse, as the worker bees flew off and never returned, leaving the queen and immature workers to die. The French beekeepers soon believed they knew the reason: a brand new insecticide called Gaucho with imidacloprid as active ingredient was being applied to sunflowers for the first time.

In the 2022 paper '[Neonicotinoid insecticides found in children treated for leukaemias and lymphomas](#)' (Environmental Health), the authors stated that multiple neonicotinoids were found in children's cerebrospinal fluid (CSF), plasma and urine. As the most widely used class of insecticides worldwide, they are ubiquitously found in the environment,

wildlife and foods. The data revealed multiple neonicotinoids and/or their metabolites in children's CSF, plasma and urine.

Bottom Line

If the 'Monsanto Papers' told us anything, it is that a corporation's top priority is the bottom line (at all costs, by all means necessary) and not public health. A CEO's obligation is to maximise profit, capture markets and – ideally – regulatory and policy-making bodies as well.

Corporations must also secure viable year-on-year growth which often means expanding into hitherto untapped markets. Indeed, in the previously mentioned paper 'Growing Agrichemical Ubiquity', the authors note that while countries like the US are still reporting higher pesticide use, most of this growth is taking place in the Global South:

For example, pesticide use in California grew 10% from 2005 to 2015, while use by Bolivian farmers, though starting from a low base, increased 300% in the same period. Pesticide use is growing steeply in countries as diverse as China, Mali, South Africa, Nepal, Laos, Ghana, Argentina, Brazil and Bangladesh. Most countries with high levels of growth have weak regulatory enforcement, environmental monitoring and health surveillance infrastructure.”

And much of this growth is driven by increased demand for herbicides:

India saw a 250% increase since 2005 (Das Gupta et al. 2017) while herbicide use jumped by 2500% in China (Huang, Wang, and Xiao 2017) and 2000% in Ethiopia (Tamru et al. 2017). The introduction of glyphosate-tolerant soybean, maize, and cotton seeds in the US, Brazil, and Argentina is clearly driving much of the demand, but herbicide use is also expanding dramatically in countries that have not approved nor adopted such crops and where smallholder farming is still dominant.”

In response to the increasing use of GBHs in India, the influential Swadeshi Jagaran Manch recently demanded a complete ban on the use of glyphosate in the country. A petition with more than 201,000 signatories favouring a complete ban on glyphosate was submitted to the minister for agriculture.

The minister was also informed that the herbicide is blatantly being used for illegally grown genetically engineered herbicide tolerant (HT) cotton. He was told that “miscreant seed companies” are trying to illegally spread HT Bt cotton on hundreds of thousands of acres of land to promote the use of glyphosate.

In [a 2017 paper](#), academics Glenn Stone and Andrew Flachs describe how cotton farmers in India have been encouraged to change their ploughing practices, leading to more weeds. The outcome in terms of yields (or farmer profit) is arguably no better but the change (conveniently) coincided with the appearance of an increasing supply of these illegal HT cotton seeds. Farmers are being pushed onto herbicide-intensive treadmills.

Industry figures like Niels Bjerre claim pesticide use is necessary in ‘modern agriculture’. But this is not the case: there is now [sufficient evidence](#) to suggest otherwise. It is simply not necessary to have our bodies contaminated with toxic agrochemicals, regardless of how much the industry tries to reassure us that they are present in ‘safe’ levels.

There is also the industry-promoted narrative that if you question the need for synthetic pesticides in ‘modern agriculture’, you are somehow ignorant or even ‘anti-science’. This is simply not true. What does ‘modern agriculture’ even mean? It means a system adapted to meet the demands of global agrocapital and its international markets and supply chains.

As writer and academic Benjamin R Cohen [recently stated](#):

“Meeting the needs of modern agriculture – growing produce that can be shipped long distances and hold up in the store and at home for more than a few days – can result in tomatoes that taste like cardboard or strawberries that aren’t as sweet as they used to be. Those are not the needs of modern agriculture. They are the needs of global markets.”

What is really being questioned is a policy paradigm that privileges a certain model of social and economic development and a certain type of agriculture: urbanisation, giant supermarkets, global markets, long supply chains, external proprietary inputs (seeds, synthetic pesticides and fertilisers, machinery, etc), chemical-dependent monocropping, highly processed food and market (corporate) dependency at the expense of rural communities, small independent enterprises and smallholder farms, local markets, short supply chains, on-farm resources, diverse agroecological cropping, nutrient dense diets and food sovereignty.

The effects of this paradigm has had devastating ecological, environmental, social, economic and agronomic consequences on highly productive traditional agrarian systems (see Bhaskar Save’s 2006 [open letter](#) to Indian officials).

Furthermore, despite claims to the contrary, it is not as though the chemical-intensive Green Revolution actually led to increased food production per capita in the first place (see Glenn Stone’s paper ‘[New Histories of the Green Revolution](#)’).

Nevertheless, predatory agri-food conglomerates have been driving this policy paradigm. In doing so, they have actively consolidated their position throughout the entire global food system while promoting the false narrative that they and their inputs are necessary for feeding the world.

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