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Glyphosate is the main active substance used in most commercial herbicides. It poisons not only plants, but also animals and humans. When testing for glyphosate contamination in an urban population, a German university found significant contamination in all urine samples with levels 5 to 20 times above the legal limit for drinking water.

Most herbicides used in commercial agriculture and small gardens as well as for de-weeding railway lines, urban pavements and roadsides contain the active substance glyphosate. The most widely used glyphosate containing herbicides goes under the name “Roundup” by Monsanto. Since the patents on glyphosate have expired, several other agrochemical companies such as Syngenta, Bayer, Nufarm and DowAgro Science have been producing and selling herbicides containing glyphosate. To date approximately half of the 800 000 tons of glyphosate produced annually worldwide are produced in China.

Glyphosate was invented in Switzerland in 1950 and first synthesized by Monsanto in 1970. The compound was found to radically affect the metabolism of plants by preventing them from forming essential amino acids. Glyphosate is a systemic-acting broadband herbicide that kills almost all green plants. Depending on the rate of metabolism, the affected plants die off completely within a few days.

Monsanto, Bayer and other companies genetically engineer crops that are resistant to glyphosate. Thus, plantations with genetically modified corn, soy or canola can be sprayed with glyphosate to exterminate weeds between the crop plants. This method, however, results in a glyphosate residue on the crop, which then enters the food chain of animals and humans.

Glyphosate in the Urine of Humans and Animals

To this day Monsanto continues to advertise its Roundup products as environmentally friendly and claims that neither animals nor humans are affected by this toxin. Environmentalists, veterinarians, medical doctors and scientists, however, have raised increasing alarms about the danger of glyphosate in the animal and human food chain and the environment. The fact that glyphosate has been found in animals and humans is of great concern. In search for the causes of serious diseases of entire herds of animals in northern Germany, especially cattle, glyphosate has repeatedly been detected in the urine, faeces, milk and feed of the animals. Even more alarming, glyphosate was detected in the urine of the farmers.

Contamination of Human Urine

To determine if only individuals who are in direct contact with contaminated feed or glyphosate laced compounds are

at risk of glyphosate poisoning a study was conducted in December 2011 of an urban population in Berlin. The urine of city workers, journalists and lawyers, who had no direct contact with glyphosate, was examined for glyphosate contamination(*). The study found glyphosate in all urine samples at values ranging from 0.5 to 2 ng glyphosate per ml urine (drinking water limit: 0.1 ng/ml). None of the examinees had direct contact with agriculture.

Death-spray before Harvests

Glyphosate probably entered human populations over the past 10 years through its increasing presence in daily foods such as meat and dairy products, vegetable and fruit produce and grains products. Glyphosate laced genetically modified Roundup soya which enters the animal food chain, is only one of the risk factors. Even more dangerous now is the increasing use of herbicides in the EU over the past several years for the desiccation of entire stocks of harvestable crop. “Spraying crops to death”, as desiccation should be more aptly called, means that herbicides are being sprayed directly on the crops shortly before they are to be harvested to facilitate the harvest by uniformly killing off all living plants (including the crops) on the field. If crops can not fully mature due to excessive rain, as was the case in the summer of 2011, herbicides are used to bring the crops to maturity by means of a “death-spray”. The method facilitates the drying of the crops as well as removing all weeds for the next sowing period, and has become common for the harvest of potatoes, cereals, canola and pulses. For potatoes, spraying herbicides on the field immediately before harvest (2.5 l/ha), hardens the skin and reduces its susceptibility to late blight and germination, which improved the potatoes shelf life. Active compounds of the

herbicide directly enter the potato through the leaves; however, decomposition of the poison takes place in the body of the consumer.

Syngenta’s advertising brochure has the following to say about desiccation: “For professional producers chemical desiccation now counts among the standard measures to assure high quality production [...]. In this context one also speaks of the “economic maturity” of crops, as the usage of herbicides allows for a safe termination of the harvesting procedure.”

With this in mind, authorities in the EU raised the legal limit of glyphosate in bread and wheat to 100 times the legal limit for vegetables. For feed grains, the legal limit was raised 200 fold, this without that these limits are being enforced by any form of relevant random sampling. Yet, the plant protection authorities are quite aware of the negative effects of glyphosate. For example, glyphosate may not be used on malting barley or for a “kill-off” during seed propagation, as this reduces germination capacity. Beer does not brew with grains that were “sprayed to death” with glyphosate. For bread and fodder grain, however, this reduced germination capacity is not a concern. Authorities, however, forbid desiccated cereal straw to be used for fodder in the same year. Unfortunately, this regulation is neither followed nor enforced.

Desiccation is one of the most egregious scandals of modern agricultural history. As such, it is worth taking a minute to consider what is actually happening in the process. Just before crops are harvested, threshed, and sold to bakeries, farmers soak them in broad-spectrum systemic herbicides to kill them off and give them the appearance of uniform maturity. One could just as well stir the glyphosate right into the bread dough. With protein-rich feed it is the same – the herbicide is sprayed directly on the grain several days before it is sold as

concentrated feed.

Pesticide and insecticide use is associated with considerable waiting periods before harvest. However, the waiting period for glyphosate [and similar drugs such as glufosinate-ammonium (Basta/Liberty Link), deiquat or diquat (Reglone), carfentzaron (Shark, cyanamide (Azodef), cinidon-ethyl (Lotus) and pyraflufen (Quickdown)], is completely inadequate because it is classified as a herbicide. While in viticulture, for example, a waiting period of 8 weeks before harvest is mandated for the usage of purely mineral sulphide; grains can be sprayed with glyphosate a mere 7 days before harvest.

There is an urgent need for action. Regardless of all the other risks associated with glyphosate, an immediate ban of desiccation must be enforced. Desiccation can be considered nothing less than negligent physical injury and is irreconcilable with current animal welfare laws.

Unlike the EU, Switzerland forbids desiccation with herbicides. Yet, Swiss livestock and their consumers are not safe, as nearly half of the food and nearly two-thirds of livestock feed is imported from countries where desiccation is a standard agricultural practice.

Other Applications of Glyphosate

Municipalities and cities use glyphosate-containing compounds for weed management on public spaces such as kindergartens, schools and parks, as well as roads and roadsides. Although the practice is legally prohibited in both Germany (§ 6 paragraph 2 Plant Protection Act) and Switzerland, municipal governments ignore this law. The Federal Railways use glyphosate to keep its railway facilities and tracks growth free, with the danger of considerable amounts of toxic vapors being released into the air on rail platforms. In allot-

ment gardens, glyphosate is commonly used for renewing of lawns and keeping pathways clear. Since glyphosate containing herbicides are available at retailers and over the internet in unlimited quantities, improper use in home and allotment gardens may not be ruled out. For conventional permacrops (ie, wine, raspberries, apples, kiwis, etc.), the area directly under the crops and, in some cases, the entire plantations are cleared with glyphosate. For certain permacrops such pine-apples, enormous amounts of glyphosate are sprayed on the crops post-harvest, as this makes it easier to plow the remains of the dead plants into the ground.

Health Risks of Glyphosate

Several disconcerting health related effects of glyphosate are well known to the plant protection agency in Germany (see: Anfrage der Grünen im Bundestag and the NABU-Study). However, little is known about the spread of glyphosate contamination through fodder and food and the subsequent health risks.

Detection of glyphosate is relatively difficult and can as of yet only be carried out in a few specialized laboratories. Glyphosate in soil is strongly absorbed and bound by soil particles. It inhibits useful bacteria and kills off algae, resulting in an increasing prevalence of phytopathogenic fungi. In addition, glyphosate can cause micronutrients, especially manganese, to become unavailable and thus lead to deficiency diseases. A similar process is suspected to take place in the digestive tract of humans and animals. In certain circumstances, glyphosate can affect the microflora of the gastrointestinal tract of humans and animals. The first studies dealing with this topic fear that the gradual negative impact on the intestinal microflora is most likely the cause of long-term health con-

sequences. However, more research is needed to determine if and to what extent the inhibition of bacteria and reduction of micronutrients has an influence on human health .

Glyphosate is becoming increasingly implicated in infertility and embryonic development of humans and animals. Adverse effects on fertility in cattle has been observed. Moreover, glyphosate is suspected to enhance cancers of the lymphatic system and promote the development of skin tumors in humans. By entering the digestive tracts of humans and animals, glyphosate becomes a time bomb that can be ignited by stress or an unbalanced or bad diet.

In early 2009, Prof. Gilles Seralini and his team of the University of Caen were able to prove (see here), that even small amounts of Roundup lead to the death of human cell cultures. Seralini concluded that the typical glyphosate presence in desiccated crops, as found in animal and human foods, causes cell damage.

In the middle of the last century, the insecticide DDT was highly praised and considered indispensable. For its producers, DDT was a big business. However, due to its chemical stability, DDT accumulated in the fatty tissue of animals and humans, which raised concerns that the substance might be carcinogenic. Following years of controversy, DDT was finally banned in the 1970s in most western countries. The evocative and thought-provoking 1962 book "Silent Spring" by Rachel Carson played a significant role in that.

We should ask ourselves what our health is worth to us and whether we want ourselves and our children to consume more and more glyphosate in the future. There were alternatives to DDT, and there are alternatives to Roundup now. It is up to consumers, farmers and the relevant agencies to stop the accumulation of glyphosate in our food supply and environment.

(*) The editors are in knowledge of the address of the university laboratory undertaking the studies, their analytical values and the evaluation of the analytical methods. Not least due to considerable pressure from representatives of the agrochemical industry and the resulting concern that the work of the laboratory would be compromised, the complete analytical data will only be published later this year. Glyphosate analysis databases are currently being compiled in several laboratories throughout Germany, Austria and Switzerland to create a standardized and representative analysis of the glyphosate contamination of animals, humans, food and fodder. Because so far it has not even been possible to elaborate ones own glyphosate exposure or that of ones livestock.

Translated by Thomas Rippel