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JOHN'S CORNER:

WEEDS and HERBICIDES: "Round-Up" (Part 2)

by John Ferguson

In the book "When Weeds Talk", Brookside Laboratories ran tests that showed only one application of the herbicide tied up 84 pounds of pure phosphate per acre! This type of nutrient tie-up leads to compaction and decreases the depth of available topsoil for roots to grow. With a smaller root zone the gardener must water more often and fertilize more often. It is then often recommended to aerate the soil to break up the compaction, another cost. The tight compacted soils favor disease development and of course, more weed pressure (one of the roles of the plants we call weeds is to loosen tight compacted soils). The process of using just one application of herbicide greatly increases the problems, also the time and money required to take care of your landscape.

Experienced gardeners know that plant growth hormones are very important to have plants that grow fast and are healthy. One of the most powerful of these hormones is the group called "auxins". One study (L.T. Biosyn Labs) found a 96% reduction in this hormone after a single Round-up application.

Similarly many enzymes required for plant health are suppressed as shown in the chart below. Note: The slide caption is "Fold" not percent change.

This slide is courtesy of Dr. Don Huber , Purdue University

Some of the 291 Enzymes Glyphosate Down Regulates

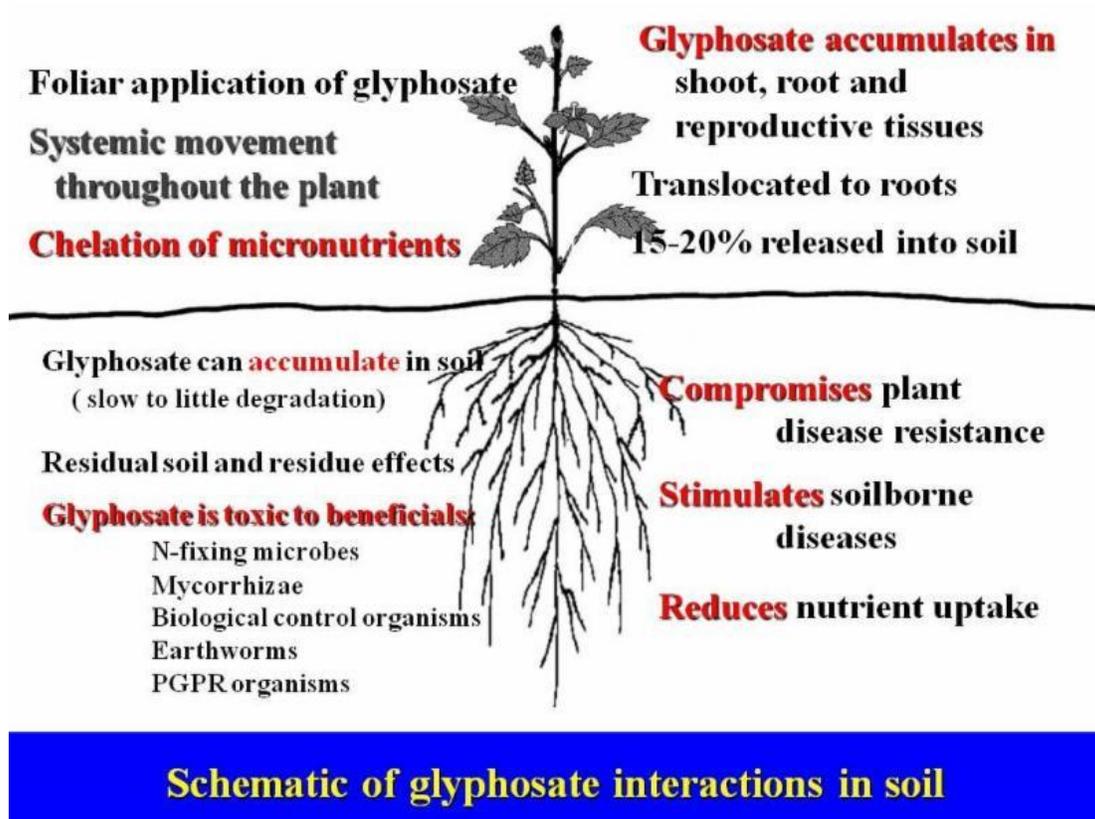
Enzyme	-Fold change
Taurine ATP-binding system	11.07
Glutamate synthase	6.06
Aminomethyl transferase	5.58
Tyrosine aminotransferase	4.36
Thioredoxin reductase	4.20
NADH dehydrogenase	4.04
Riboflavin synthase	3.57
3-phosphoadenosine-5-phosphosulfite reductase	3.75
Membrane bound ATP synthase	3.67
Acetolactate synthase	3.59
Pyridine nucleotide transhydrogenase	3.50
Shikimate kinase	3.36
3-deoxy-D-arabino-heptulosonate-7-phosphatase	3.38
Sulfite reductase	3.19
RNAase	3.18
Glutathione S-transferase	3.04
D-amino acid dehydrogenase	3.00
Glucose-6-phosphate dehydrogenase	2.67
ATP sulfurulase	2.65
5-enolpyruvylshikimate-3-phosphate synthetase (EPSPS)	2.62

The combined effects of Glyphosate from nutrient tie-up, increased pathogens in the soil, reduction in plant hormones, reduction in enzyme efficiency, etc. create weak plants that are very susceptible to insects and diseases.

We have all heard the phrase, "survival of the fittest". In nature the microbes that we call diseases or pathogens and the insects we call pests, have a role to play. Their job is to get rid of weak and unhealthy plant species so only the strong survive. Hence, they attack plants grown in herbicide treated soils or plants treated with herbicides (the herbicide is excreted into the soil by root exudates).

The slide below is pictorial summary of all the damage done by Glyphosate.

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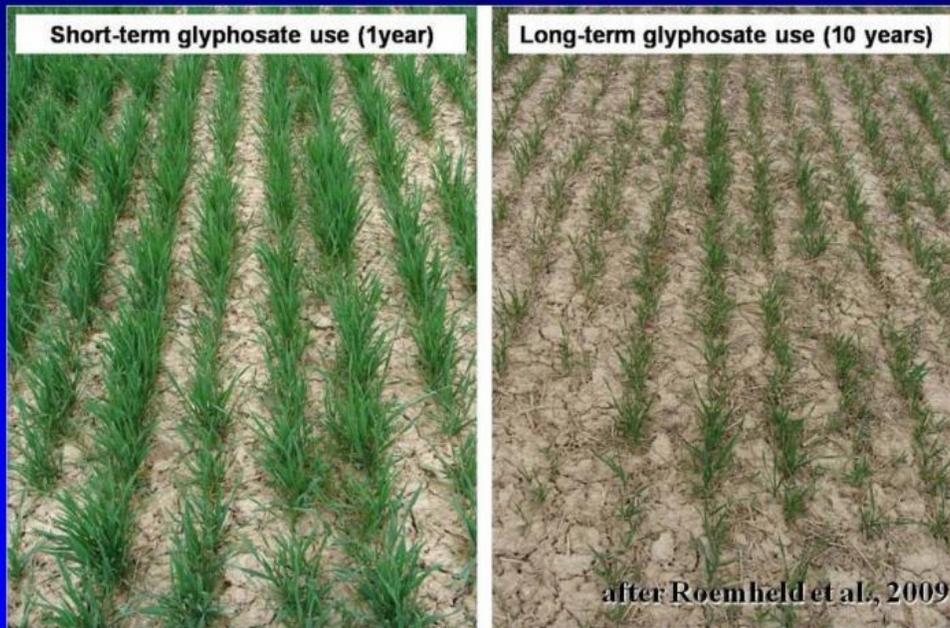


Round-Up is slow to breakdown in the soil, hence the negative effects tend to be cumulative. The slide below of a wheat crop illustrates this effect. The first year Round-Up was applied the wheat crop germinated and grew, however by the 10th year of using Round-Up the seeds could not germinate and the ones that did had problems growing and were not healthy. We see the same effects in our landscape where Round-up has been used repeatedly.

This slide is courtesy of Dr. Don Huber , Purdue University

Long-term Effect of Glyphosate

Negative side-effects of long-term glyphosate use, 2008 & 2009



Note: Don Huber, PhD is now Professor Emeritus of Plant Pathology at Purdue University. He has over 50 years of agricultural research on soil and plant pathogens and microbial ecology. He has served as Associate Director of the Armed Forces Medical Intelligence Center after 41+ years of active and reserve duty with the rank of Colonel. He has served as a consultant for the Center for Disease Control and many other organizations.

It has been stated that Glyphosate is many time more toxic than DDT and in conjunction with GMO crops a threat to the survival of humanity.