EARTHGEN215, LLC

September 2023 Newsletter

When selecting seeds, seed-traits best suited for an area's climate factors and soil conditions are generally evaluated. Also considered are traits such as days-to-maturity, plant height, and seed/grain-weight.

Non-GMO barley-grain could be used as seed for 2024 growing season.

EarthGen215 strongly encourages planting **non-GMO seeds**. Hybrid varieties are usually non-GMO seeds, and as such are not the same as genetically engineered ("GE") seeds. To support this assertion, consider the following brief description of natural seed production.

Seed-traits are coded in genes of each seed. A combination of genes cluster within a seed and form chromosomes. Each species contains a set number of chromosomes. For example, barley and rye each have 14 chromosomes. Cultivated alfalfa has 32 chromosomes, and wild alfalfa has only 16 chromosomes. Corn and maize each contain 20 chromosomes, while wheat and oats each have 42 chromosomes. Soybeans and other dry beans each have 22 chromosomes. Peanuts have 40 chromosomes in each peanut seed. Cotton has 52 chromosomes. (Humans have 46 chromosomes).

Genetic engineering is done by human beings deliberately altering the structure of genetic material in a living organism. Usually, genetic engineering involves cutting up DNA molecules and splicing together fragments from more than one molecule. Natural breeding involves breeding one variety of corn with another variety of corn to produce the desired traits from each variety in the resulting corn. When employing genetic engineering, corn's DNA molecules are spliced and combined with DNA molecules from a bacterium, or some other organism with which corn was never intended to be cross-bred. Extra chromosomes cannot be added to corn or to any other species that is genetically engineered. Rather, for each trait spliced into the subject species, a chromosome that is naturally part of the species is thrown out. More often than not, the discarded chromosome from the species being manipulated is a chromosome that supports and bolsters that species' immune system. The more traits spliced into a variety of corn or other species; the more natural chromosomes are discarded. Thus, genetically engineered corn, soybeans, alfalfa, or any other species, usually end up with a compromised immune system.

Non-GMO alfalfa-orchard grass mix showing alfalfa blossoms that could mature into seeds for alfalfa production in 2024 and beyond.

Genetically engineered crops were first introduced in 1996. Traits spliced into seedgenetics such as corn, soybeans, cotton, or alfalfa, usually include herbicide tolerance and some type of insect resistance. Active ingredients applied most often on herbicide tolerant crops are glyphosate and glufosinate ammonium. The name brand most familiar for glyphosate is probably Roundup, and the name brand likely most familiar for glufosinate is Liberty Link. The modes of action for each of these herbicides is very different from the other. Glyphosate is an organophosphorus compound from the herbicide chemistry Group 9. It inhibits the EPSP synthase pathway. In effect, it functions to block essential amino acids required for photosynthetic processes. Glufosinate ammonium is also an organophosphorus compound, however, it is from Group 10. It inhibits a plant's ability to use nitrogen as is necessary for healthy maturation and production. Glufosinate ammonium in a plant that is not genetically engineered to tolerate it, causes ammonium in that plant to become toxic and weaken or kill that plant.

Glyphosate weakens plants' natural immune functions and increases the virulence of root-associated pathogens (see page 157 in Chapter 10 authored by Robert J. Kremer, Synthetic Pesticide Use in Africa for further details and explanations). Glyphosate enters soil by applications of it for herbicide purposes, and it also enters soil via root exudates from GE plants, and decomposition of crop residue from GE crops. When in soil and within GE crops, glyphosate limits the availability of micro-nutrients such as manganese and zinc. Its accumulations in soil and plants eventually immobilizes other nutrients with a positive charge such as potassium, calcium, and magnesium

GE crops are designed to produce insecticidal compounds known as cry toxins that originate from the bacterium Bacillus thuringiensis. These insecticidal compounds are carried into soil by GE crops' root exudates, and they damage beneficial soil organisms in the rhizosphere (root zone) of GE crops.

Including applications of the Biological Products EarthGen215 represents, as recommended, as well as other soil management practices such as crop rotation, cover cropping, applying composted manure, or otherwise involving livestock in crop production cycles, helps restore healthy micro-organism, arthropod, and macro-organism diversity and activities in soil. These beneficial organisms' activities dilute the accumulations of glyphosate, its metabolite (AMPA), glufosinate, and other harmful chemical residuals, thereby reducing their harmful effects on soil life and crop production.