AEA Concept #5

Healthy plants create healthy soil.

It's common knowledge that healthy soil creates healthy plants, but the reverse is also true. How so? As plants grow, they send out a great deal of energy into the root system. Plants also sent out root exudates: sugars, amino acids, and other compounds. These compounds are then transferred through the roots as exudates which build soil. These root exudates can be seen as a plant's energy flow over the course of the plant's lifetime, where the sugars produced during photosynthesis flow through the plant from the day the seed is planted until it is harvested or dies. Plants use sugar in four roughly-equal ways: 25% is sent to the root system, 25% is used to build plant frame, another 25% forms and fills the fruit, and the last 25% is sent out through the root system as root exudates to feed soil biology. During the framing stage, when sugar is being sent through the root system as root exudates, the plant is investing energy it will need later during the growing season. In fact, as much as 70% of total plant photosynthesis is sent out through the roots. During the filling grain and fruit filling stages, the fruit is the primary sugar sink, meaning much less sugar is sent into the soil.

Here is an image of an oat plant grown on a farm we started working with in spring. We used Rejuvenate as a soil application and after eight weeks we pulled the plant out of the soil to find

very good soil structure, crumb structure, and porosity. You can also see the soil adhering to the plant root system, a sign of good fungal and bacterial activity with that rhizosphere.

All truly healthy plants invest in this way in their own soil and we can change soils very quickly using root crop residues that are digested to make healthier soil activity. Soil can be built while growing corn, soybeans, or any row crops; but the most effective and quickest way to build soil health is by letting livestock graze in the field, which provides great organic matter and soil building benefits. But the biggest impact remains in the root exudates, particularly the liquid component, which build humic substances in soils very quickly.