

Carbon Sequestration Research

Sequestering carbon in soil is a critical element in mitigating climate change. Carbon Sequestration is defined as the removal and storage of carbon from the atmosphere in carbon sinks (such as oceans, forests or soils) through physical or biological processes, such as photosynthesis.¹ “The soil carbon pool alone is 3.3 times the size of the atmospheric pool and 4.5 times the size of the terrestrial biotic pool”². This is particularly important in our northern temperate climate where photosynthesis slows down significantly during the winter months.

The prairie ecosystem was a huge soil builder in our region. A recent study completed at Cedar Creek Natural History Area (www.cedarcreek.umn.edu) by David Tilman (Dept of Ecology, Evolution, and Behavior, University of Minnesota) and D.A. Fornara (Institute of Environmental and Natural Sciences, Lancaster University, UK) showed that “high diversity mixes of perennial grassland plant species stored 500% and 600% more C[carbon] and N[nitrogen] than, on average, did monoculture plots of the same species. Moreover, the presence of C4 [warm season] grasses and legumes increased soil C accumulation by 193% and 522% respectively. Higher soil C and N accrual resulted from both increased C and N inputs via (1) higher root biomass and (2) greater root accumulation to 60cm soil depth resulting from the presence of highly complementary functional groups (i.e. C4 grasses and legume species)”³. To read the complete report on the 12 year study, go to <http://cedarcreek.umn.edu/biblio/fulltext/t2134.pdf>

Our Climate Victory gardens are perennial polycultures based on this research. Polycultures are simply the growing of more than one species or crop variety in a patch or space at one time⁴. They include plants from each category (warm season grasses, cool season grasses, legumes and flowers) in the same ratio as the research plots. In addition, plants have been included that extend the period of photosynthesis. The Climate Victory garden designs are positioned in the polyculture to optimize synergies and aesthetics.

¹ Source *Green Facts*

² LAL, R. (2004). Soil carbon sequestration impacts on global climate change and food security. *Science*, 304, 1623-1627.

³ Fornara, D.A. Fornara and D. Tilman. (2007). Plant functional composition influences rates of soil carbon and nitrogen accumulation.

⁴ Dave Jacke, *Edible Forest Gardens* (2005)