

SLV Agronomy News

April, 2002

Cropflex Offered Again!

This decision support software will be offered to San Luis Valley farmers again this year. Dr. Israel Broner, developer of this computer software will be here to explain the program on April 23 at 6 pm at the Colorado Potato Administrative Committee (CPAC) Office in Monte Vista. A light dinner will be provided; call us so that enough food can be arranged: call Maxine (589-2271) or Sharon (754-3494 extension 0).

Cropflex Information Meeting
Dinner Provided; please Call !
6 pm, April 23, 2002
CPAC Office (near Safeway)
Monte Vista, CO

CSU Cooperative Extension will continue providing weekly support for those willing to use this program. Also, Israel will be here during the weeks of April 15 and 22 to get growers started or restarted.

Don't you sometimes wonder how much water you need to apply? This software takes the guesswork out of irrigation management and can reduce costs and/or improve crop yields. It uses a checkbook method of accounting for irrigations vs. crop water use. Irrigations and rainfall must be entered.

The computer needed to run this software must be IBM compatible with Windows 95 or higher. An internet connection is nice; but not absolutely necessary. You simply save the weather for Center or Blanca to a disk; then open it in Cropflex. This software calculates nearly the same values for crop water use as those published daily for many years. However, by using this program, you can specify your own exact planting date instead of interpolating between the two dates given. If you are interested in this irrigation scheduling technique, come and learn !

Building Soil Organic Matter

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(NOTE: Most of this material was presented at the 2002 SLV Potato/Grain Conference. The presentation was entitled "A Sustainable Rotation")

Some farms add compost to their soils, grow high residue crops in rotation with potatoes and practice conservation tillage. Winter wheat is grown to further protect the soil from Spring winds. Other farms practice baling straw, moldboard plowing, or growing two years of potatoes. Which practices are sustainable for our soils? Do these practices lead to improved or reduced productivity?

A theme of the last several Potato/Grain Conferences has been to "Improve Soil Biological Activity." Improving your soil's organic matter percentage is one way of measuring progress. Methods to

Why Build Soil Organic Matter ?

- Builds soil health**
- Builds productivity**
- Builds water holding capacity**
- Builds cation exchange capacity**
- Improves soil structure**
- Reduces soil erosion potential**
- Improves nutrient cycling**
- Provides energy for microbes.**

improve soil organic matter also increase soil biological activity. One goal of a sustainable rotation might be to increase, not decrease, the organic matter content of the soil. Organic matter provides many benefits for the soil. Good management practices will improve the soil organic matter content in the long term.

Rotating small grains with potatoes puts a high residue crop in rotation with the low residue potato crop. A high residue crop not only increases the amount of crop residue in the rotation; it also produces crop residue to protect the soil from wind erosion. Thus, it seems inconsistent to completely turn under the residue as happens with the moldboard plow. And, though baling straw may leave enough residue for surface protection; obviously baling reduces the amount of crop residue returned to the soil. Baling straw reduces the possibility of increasing the soil organic matter.

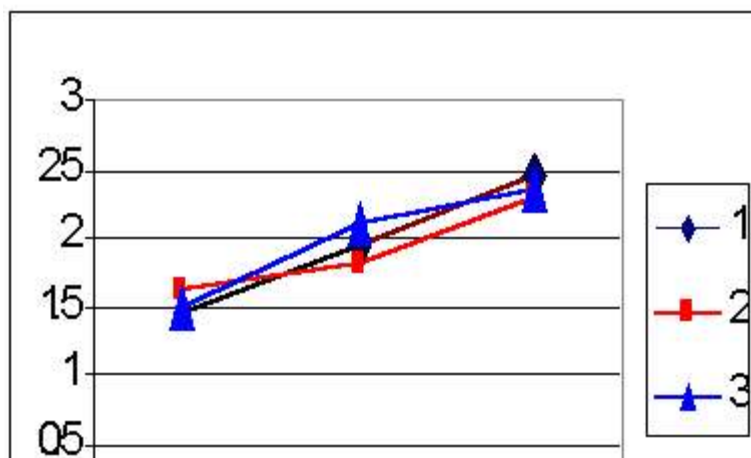


Figure 1. Level of soil organic matter increasing on neighboring farm from 1992-2000.

Information available locally, indicates that some area growers are increasing their soil organic matter in a potato-grain rotation. Results of one farm neighboring the SLV Research Center is shown in Figure 1. This grower has grown potatoes and wheat in rotation

for many years. The straw was not baled and conservation tillage was used. The organic matter increased from 1.5 to 2.4 percent. When the farm was purchased in 1974, the level was only 0.4%; it increased to 1.5% by 1992 and then to 2.4% by 2000.

Research indicates that increasing soil organic matter will improve the soil productivity -- your crop yields! In fact, many researchers indicate that organic matter is the most important component of soil quality because it:

- *Improves aggregate stability and soil structure
- *Reduces erosion potential
- *Provides energy for micro-organisms
- *Improves nutrient cycling
- *Increases both water infiltration and water holding capacity
- *Increases the cation exchange capacity
- *Speeds up the breakdown of pesticides

Good management practices can increase organic matter in our soils.

Practices to Improve Soil Organic Matter

* Use perennial crops. Several years of either alfalfa or grass pasture can help. These perennial crops return large amounts of crop residues. Plus, since the crop is perennial, no tillage is performed. The combination of perennial crops and no tillage for several years will increase soil organic matter.

* Use high residue crops. Apply optimal fertilizer to maximize small grain vegetative growth. High yields permit the return of large amounts of crop residues; some eventually

becomes soil organic matter. The more organic matter returned to the soil, the better.

* Limit tillage (use fewer tillage operations and less intensive tillage, i.e., chisel vs. moldboard). Tillage aerates the soil and triggers biological activity, rapid decomposition, loss of soil organic matter and release of CO₂. Reducing tillage can increase carbon sequestration in the soil and the amount of organic matter retained in the soil. There is a definite trade-off in growing potatoes, however, because potatoes need good aeration.

* Add compost or manure. These products directly add organic materials. Composted materials are already mostly decomposed forms of organic materials. These products can greatly impact soil organic matter, if added in large volumes over several years.

* Add cover crops and green manure crops to the rotation. Cover crops are grown primarily to protect the soil against erosion. Green manure crops are grown in order to be turned under to improve the soil. Turning under green, immature crops enhance microbial growth, improving soil structure, tilth, and nutrient cycling.

* Limit wind erosion. Wind erosion allows the fine clay particles and microscopic organic matter to escape. Sand particles may end up in the ditch or the neighbors field; but, the fine clay and organic matter are airborne for long distances and are lost.

Soil Structure

Building soil organic matter should improve soil structure. Soil structure is not texture, but is the grouping of individual soil particles into stable aggregates. Its stability depends on the nature of the clay and humus present. Structure

is granular, blocky, or platy. Worst is the puddled or structure less soils such as sodium affected soils.

One extreme is the loamy sand soil which has mostly individual particles. Sands have certain obvious advantages: looseness, friability, good aeration and drainage, and are easily tilled. Such soils also have disadvantages -- holding little water between irrigations and being easily blown by the wind. With a little more clay and more organic matter, these soils hold more water, have better structure and are less easily blown. The maintenance of organic matter is of great practical concern. There is only one practical way of improving the sand -- the addition of organic matter.

Soil structure is important to the nutrient

supplying capacity and air content and movement. Aeration is improved by good soil structure.

Compaction

Closely related to structure and organic matter is compaction. Soils with good, stable aggregates provided by Soils with improved soil structure and organic matter are less likely to become compacted. A NebFacts handout is available for your consideration, NF95-243. The title is "Soil Compaction Tips".

Summary

Most San Luis Valley growers are doing a great job of managing their cropping rotation; building soil organic matter and crop productivity at the same time. Good farming practices that reduce tillage and return plant residues to the soil are slowly rebuilding our stock of precious soil organic matter.