Using a 3rd Crop to Enhance Soybean Production

What is a producer to do? Frustrations and concerns with growing soybeans is hitting an all time high. Lower yields, Soybean Cyst Nematode, Aphids, low profits, and now the eminent arrival of Asian Rust has left many producers looking for options. Rural Advantage is pleased to provide some background on benefits of 3rd crops & various options for producers on replacing some acres of soybeans and adding much needed alternative crops to the farm rotation. Adding alternative crops needs to be viewed as a change to the farming system. Too often undue emphasis is placed on finding that mythical alternative crop that is grown exactly like corn/soybeans, i.e. an annual row crop planted, harvested, stored, and transported like corn/soybeans with the same or greater possibility for profit. After decades of research it appears this mythical crop may never come. However, by making subtle changes to the farming system (traditional corn/soybean monoculture) using 3rd crops many of the benefits producers are looking for in that mythical alternative crop can be realized with already available 3rd crops.

Benefits of adding alternative crops

Many benefits are available from the introduction of 3rd crops in the farm system. Some benefits will be realized in the short term and some in the long term.

- Spread risk: The simple management decision of adding a 3rd crop spreads risk; thus instead of 2 crops (corn/soybeans) in the system we may have 3 or 4.
- Input costs: Direct input costs of seed, fertilizers, & pesticides are reduced by naturally breaking the cycles of weeds, insects, & diseases.
- Improved soil health: Several crops in a rotation system add organic matter and microbial activity to the soil making it more productive as well as sustainable for future generations. In addition, legumes, & small grains decrease soil erosion.
- Better crop quality: Research has proven that crop quality & yields are superior in a more diverse crop rotation utilizing more 3rd crops.
- Better profitability: Scientific research has proven a diverse crop rotation increase profitability by lowering input costs and increasing value of grown crop

What options are available?

Rural Advantage has structured available options of 3rd crops in terms of ease to transition. Therefore the first options are those that need little energy, knowledge, or capital to add into the rotation system.

Cover Crops: Cover crops are planted in late summer or fall to provide cover to the soil over the winter, hold moisture, add organic matter, and suppress weeds. Cover crops are not direct income producing crops; instead they aid in building soil tilth and microbial levels which has a direct impact on crop quality and yield. In this region the most common form of cover cropping is broadcasting cereal rye (winter rye) in early September on corn. The rye utilizes residual nitrogen and provides soil cover throughout the winter. When killed in the spring the rye provides a water conserving mulch and suppresses weeds in soybeans using its allelopathic characteristics.

For more information visit:

ATTRA - National Sustainable Agriculture Information Service
http://attra.ncat.org/attra-pub/covercrop.html
Minnesota Institute for Sustainable Agriculture (MISA)
http://www.misa.umn.edu/

Alfalfa/grass/clover: Hay is a great transition crop to add to your crop rotation. A perennial legume it benefits the rotational system by staying on the landscape all year round and fixing nitrogen for the following crop. Organic growers typically use alfalfa as a transition crop to attain Organic Certification. In traditional rotations alfalfa is a cash crop worth over $10 billion annually in the United States, third only to corn and soybeans.

For more information visit:

Department of Agronomy and Plant Genetics, **University of Minnesota**
http://forages.coafes.umn.edu/ .
Forage Research and Extension, University of Wisconsin Extension
http://www.uwex.edu/ces/forage/articles.htm.

Small grains: Small grains include oats, wheat, barley, triticale, & flax. Small grains have a very important role within the rotation system. Small grains provide diversification and typically leave high amounts of residue after harvest. This, in turn, adds valuable organic matter to the soil. Small grain crops have traditionally been the least profitable crop within a rotation; however with the increased demand for flax they can now compete with corn/soybeans in terms of profitability. In this particular region utilizing alfalfa as a crop preceding small grains is particularly important due to the residual effects of chemicals such as Atrazine on the establishment of small grain crops.

Energy crops: Energy crops include perennial grasses as well as woody biomass plants. Switchgrass, miscanthus, big bluestem, willow, and hybrid poplar are a few examples. The benefits of grasses in a rotation are similar to alfalfa although energy crops are not nitrogen fixing. Reduced soil erosion, increased organic matter, enhanced water quality, as well as diversity are the main benefits. Agroforestry plants such as willow and hybrid poplar are perennials that grow quickly and produce significant quantities of biomass. Energy crops are still in their infancy; however several regional projects are up and running that utilize energy crops for electricity and heat. Ethanol production from cellulose plants instead of corn grain is being researched. Technology is available and in use so producers should be aware of the opportunities that may exist for growing energy crops.

Hazelnuts: Hazelnuts are significantly different from all other 3rd crops in several ways. The Hybrid Hazelnut is a perennial bush that produces nuts. They are not intended to fit into a rotation but instead replace some acres of soybeans. The plants are best suited for highly sensitive environmental areas such as adjacent to open water sources, steep slopes, riparian buffers, and wetlands. They live for over 50 years and produce heavy and very profitable crops. Hybrid Hazelnuts benefit the farm system by adding diversity to the landscape, enhancing water quality, eliminating soil erosion, increasing wildlife habitat and providing a high profit margin 3 to 4 times that of corn/soybeans.

Emerging Crops: Several emerging alternative crops currently being researched have great potential for addition into a farm rotation. Cuphea is a high value oil crop that is rich in medium chain fatty acids. Research and breeding programs have been started to address some of the agronomic issues associated with growing it. Campalina is an oilseed crop with promise for biodiesel use. Illinois Bundleflower is a native legume in Minnesota that has potential as a high yielding forage crop for livestock. For all the bad press artichokes have received over the previous decades, it still holds promise as a viable alternative crop for producing a type of sugar and as a feedstock in ethanol production.

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