

Thinking of diversifying with crop rotation?

By Meryl Rygg McKenna

Crop rotation is the practice of growing different crops in succession on the same land to improve soil fertility, reduce economic risk, and help control insects and diseases.

A little background

Crop rotation strategies have been around for ages; archaeologists say Middle Eastern farmers alternated between legumes and cereals as far back as 6000 B.C. European farmers used three-year rotations from the late Middle Ages until the 19th-20th centuries, and Belgian farmers developed four-field rotations as early as the 16th century using wheat, turnips, barley and clover.

As the Green Revolution grew from the 1940s to the late '60s, agricultural practices shifted away from crop rotation. Modern farming promoted monocultures supported by high-yield crop varieties, modernized irrigation and management techniques, fertilizers and pesticides.

However, growing the same crop repeatedly can disproportionately deplete the soil of certain nutrients, creating higher fertilizer needs along with potentially higher weed, insect and disease infestations.

Why rotate?

Crop rotation is known to decrease weed, insect and disease issues, reduce economic risk, and increase yield.

Good rotations involve crops that use nutrients and water efficiently from different areas of the soil, depending on root depth and breadth. For example, crops such as canola, winter wheat and mustard can scavenge deep nutrients and bring them closer to the surface. A rotation with only pulse (nitrogen-fixing) crops and spring small grains will not be able to reach as deep in the soil, and once nitrate is below their root zones it will likely be lost.

Alternating crops of deep-rooted and shallow-rooted plants also improves soil structure. Fibrous roots should help with aggregation, and tap roots should help break up plow layers.

Rotation is a key tool for managing weeds, pathogens, and insects that often occur when one species is cropped continuously. Crops with different shapes and growth habits create environments that discourage weed establishment. It is also important to vary crop growth periods (that is, winter vs. spring crops; early vs. late spring planting) to keep weed communities off balance.

A traditional element of crop rotation that is seeing renewed interest is the replenishment of nitrogen through the use of green manure – cover crops – in sequence with cereals and other crops. More information is available from the MSU Extension Service at www.msuextension.org.

Down to specifics

Kory Leininger is a Certified Crop Adviser based in Scobey, Mont. We asked his perspective on a few points:

Question: How can a grower decide between crop-fallow, crop-crop-fallow, and recrop?

KL: I would call this a risk issue. In our area (northeastern Montana) fallow acres have declined significantly. While leaving a field fallow can increase water storage and help manage weeds, it can also lead to decreased organic matter, increased nitrate leaching and soil erosion, with no immediate economic return.

Since we've been having abundant snow and rainfall, spring wheat and durum have been yielding just as well on pulse crop stubble as following fallow. Growing the pulses brings profit, whereas fallow acres do not. Drier years might not yield as well following pulse crops as after fallow, but the money made growing the pulses, coupled with the cost of fallow, would likely push the profitability of pulse/wheat rotations ahead of the wheat/fallow rotations.

In my opinion, raising pulse crops decreases the risks associated with recropping. Without pulse crops, the decision would be based on moisture and commodity prices. The risk would increase from crop-fallow to crop-crop-fallow to recrop. Higher commodity prices would lower the risk of recropping, as would abundant soil moisture at planting to some extent, but ultimately it would come down to gambling on in-season rainfall.

Factors in favor of crop-crop-fallow or recrop over crop-fallow include making money on the pulse crops, increased N availability because of nitrogen fixation, and breaking disease cycles.

How can a grower decide between canola, lentil, pea, or other alternative crops?

KL: The first thing to look at would be your past chemical applications. You need to be sure you don't have any residual chemicals hanging around to nail next year's crop. For example, some chemicals would devastate lentils or peas, but not canola or mustard... and vice versa. Some take a year to go away; some take as long as five years. Check the labels on chemicals you've been using to see what rotation restrictions they have, and err on the conservative side.

Specifically, herbicide overlap can double the time needed for herbicides to degrade to the point where they're not toxic to sensitive crops like lentils.

You also need to make sure you have the right equipment. Raising peas and lentils requires you to have a field roller and a flex head on your combine, which can be significant investments. Dirt and straw clumps need to be flattened or they can make harvest miserable.

Are there cost issues to consider?

KL: There's a myth that raising peas and lentils is cheaper because you need less fertilizer. In reality, raising peas and lentils can be just as expensive when you factor in

seed costs, inoculants, land rolling, fertilizer, chemical and possible fungicide applications, desiccation, and higher harvest costs.

Canola has high seed and fertilizer input costs, but the price of oilseeds right now helps balance them nicely. Plus, newer pod-shatter resistant varieties eliminate the need to swath, which lowers the input costs.

What other factors are important?

KL: Pulse crops are particularly sensitive to insect pests. For example, with cutworms, the economic threshold for peas and lentils is much lower than for wheat. Just a few cutworms per square yard can quickly thin a stand of peas or lentils, leaving bare spots or uneven ripening in fields.

Another example is grasshoppers in flowering lentils. Most growers wouldn't think much about two 'hoppers per square yard in wheat, but that same number of 'hoppers in lentils can clip off enough flowers to cause significant economic damage. Growers, or their advisers, need to scout early and often when growing any alternative crop.

For more information on certified crop advisers, go to <http://www.certifiedcropadviser.org>.