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## Advanced Crop Rotation Concepts

In many ways crop rotation is a lost art. The diverse rotations we once used have been discarded by economic considerations, mechanization, fertilizer usage, pesticides and specialization in both livestock and crop production. Why should we consider increasing our diversity by adopting rotation systems again?

Commodity prices are low relative to the costs of fertilizers, machinery, labor, and pesticide inputs. This has led producers to examine means of reducing these costs. Natural selection pressure to select resistant species of weeds, insects, and diseases is greater in monocultures and short rotations like corn-soybean rotations. These translate into yield losses in the form of soybean cyst nematode, corn rootworms, herbicide resistant weeds, et. The farm program changes allowing freedom to choose crops is certainly a part of this emerging interest in rotational diversity.

Mother Nature is an optimist and we are providing the opportunity for her, because of our lack of cropping diversity. Crop rotations need to feature a systems approach, adequate diversity, and proper intensity.

We often calculate our cost of production on a crop by crop basis. We really need to evaluate our costs on a rotational cycle basis. Many crops like wheat generate income in the next crop year. Dryland corn yields are nearly 30 bushels per acre higher following wheat than continuous corn and 15-18 bushels better than corn following soybean. We certainly want to use the free nitrogen produced by legume crops for grass crops.

Diversity in rotations relates to seeding depth, rooting patterns, root structure, residue type, and insect pests. We need to take advantage of the unique characteristics of each crop. A goal is to have a two year break between crops of the same type. We would like at least three or four year crop types in the rotation. Crop types refer to cool season grasses, warm season grasses, cool season broadleaf, warm season broadleaf winter annual, etc. The rotation could be simple with three or four crops following in succession, or more complex with greater number of crops or two years of a crop followed by longer breaks between crops. We need to consider the five main crops of our area - corn, milo, soybeans, wheat, and alfalfa - for our rotations. We also need to look at opportunities for minor crops we can grow well for seed or forage use, like forage millet, forage sorghum, oats, triticale, turnips, red cover, and sweet clover.

Proper intensity is the selection of crops to fully utilize available growing season, nutrients, and water available. The ideal would be to fully utilize water without creating crop failures. Proper intensity is going to manage the moisture risk for the operation.

The Dakota Lakes Research Farm, managed by South Dakota State University, is a great place to get more information about crop rotation systems. Query <http://www.dakotalakes.com> on the internet.

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