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## USING COVER CROPS TO IMPROVE THE SUCCESS OF CROPPING SYSTEMS

**Cover crops are used to reduce soil erosion, improve soil structure, conserve and build up crop nutrients, and help control weeds, insect, and crop disease pests.** They are typically grown in the idle season between normal spring planted crops. For example, in a corn-soybean rotation, cover crops may be grown after harvest of the soybeans in the fall, through the winter, and into the early spring before planting corn.

**There are many different types of cover crops.** But usually they are a legume (e.g., clover), a small grain cereal (e.g., rye or oats), or a mixture of a legume and a small grain cereal. The cover crop needs to be regionally adapted to achieve sufficient growth in the fall before winter to provide adequate ground cover to control water or wind erosion until the subsequent harvested crop is planted and established. For example, a warm season legume or annual grass may be unable to establish and grow in a cooler or temperate climate. However, a cool season legume or small grain cereal might grow well as a cover crop during the cool winter period between warm season crops. Another useful feature of a successful cover crop is that it is easily terminated, or suppressed before planting of the next harvested crop.

**Soil structure improvement is a result of addition of plant residues to the soil for maintaining or increasing soil humus content.** This contribution is from both the cover crop roots and shoots. The decaying roots of the cover crops leave root channels that facilitate the growth of subsequent crop roots. Some cover crop mixtures include taproot plant species that can help break up shallow compact subsoil layers, caused by natural soil forming processes, or as a result of tillage or wheel traffic induced compaction. For example, turnip or radish species that have robust taproots can be included in a cover crop mixture for sub-soiling of compact soils.

**Cover crops can enhance soil nutrient status in several ways.** The cover crop takes up and stores nutrients that may otherwise be susceptible to over-winter losses from leaching (i.e., nitrates, sulfates and chlorides), and or denitrification losses of nitrate. Physical acquisition of plant nutrients from subsoil layers, and movement to the soil surface or topsoil in cover crop shoots and roots may occur. This can, over a number of years, effectively enrich topsoil with low mobility soil macronutrients such as phosphorus, potassium, calcium and magnesium, and low soil mobility micronutrients (e.g., copper, zinc, manganese, and iron). Finally, the cover crop may help increase the pool of more easily available nutrients (labile) as the nutrients from cover crop residues may be more easily mineralized for crop uptake than those from more stable soil organic matter.

**Weed, insect and crop disease pests can be reduced in a cropping system using cover crops.** This can be accomplished by growing a cover crop that is a poor, or non-host, for insect and fungal pathogens that adversely affect harvested crops. The presence of cover crop residues can cover the soil surface and suppress weed seed germination and emergence before the subsequent crop is planted, emerges and becomes established.

**It is advised that you check with local crop advisers** as to what cover crop species or mixtures of species are locally adapted to and successful in your specific region, and as part of the cropping system you practice.

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