Role of Annual Legume Cover Crops in Efficient Use of Water and Nitrogen

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Crops grown in rainfed production systems are usually subjected to periods of drought stress of varying length and frequency during the growing season. The mulch formed by a cover crop with conservation tillage can eliminate some of these short periods of drought stress and lessen, but not eliminate, the effects of longer periods. Soil water conservation is one of the major benefits of conservation tillage, but this and other advantages of the practice are heavily dependent upon the presence of a vegetative mulch cover on the soil surface. The most effective cropping strategy to assure a mulch cover during the primary cropping season is to grow a cover crop during the dormant season or off-season, usually the winter. Winter cover crops of either grasses or legumes are compatible with conservation tillage methods and offer several important benefits that protect and improve the soil and can increase production efficiency. Until recently, cover crops used with conservation tillage have been mostly small grains, particularly wheat (*Triticum aestivum* L.) and rye (*Secale cereale* L.).

Since 1975, there has been renewed interest by both farmers and agronomists in cropping strategies that combine legume cover crops with conservation tillage. Kindled by the energy crisis and rising cost of N fertilizer in the 1970s, this interest has been fueled by the rising awareness of the need to control soil erosion, restore productivity of eroded soils, and improve efficiency in crop production.

A legume cover crop provides a substantial amount of biologically fixed N to the primary crop, as well as providing the other advantages offered by a nonlegume cover crop. In some cases, the amount of N provided by...