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Practical Tips to Grow and Manage Cover Crops

Jim Hoorman, Putnam County AGNR Extension Educator will be out of the office from July 20 through August 5th, teaching Cover Crops and Soil Ecology in China. If you have questions, please call the Extension office (419) 523-6294 or contact Curtis Young (419) 238-1214 in Van Wert County or Ed Lentz (419) 422-3851 in Hancock County. The following are 10 tips for growing and managing cover crops.

Tip 1: Use cover crop mixtures composed of at least one grass, one legume, and one brassica or other diverse cover crop species. Mix summer annuals with fall and winter annuals to increase crop diversity.

Tip 2: Select diverse species that maximize both sunlight and moisture interception. At least 50 percent of cover crop species should be low growing, another 30 percent intermediate, and 20 percent tall growing. Select cover crops that have a variety of taproots and fibrous root systems that incept moisture from different soil regions. The goal is to utilize 100% of available sunlight and moisture to minimize direct competition for nutrients and water.

Tip 3: To determine initial seeding rate in cover crop mixtures, divide the full rate of seed needed for each cover crop in a monoculture and divide by the number of cover crop species planted. Small seeded cover crops should be planted shallow, large seeded cover crops deeper. Set the planter or drill for the largest seed in the mixture. For example, a simple cover crop mixture is oats, crimson clover and radish. The full rate for oats by itself is one bushel per acre (32 pounds) divided by 3 or 10-11 pounds in a three-way mix. Crimson clover is 15 pounds by itself or 5 pounds/A in a mixture and radish (daikon) is 3-5 pounds/A by itself or 1-2 pounds in a three way mixture.

Tip 4: Add manure or fertilizer to cover crops to increase biomass production. Most fertilizer or manure applied will become available to the next crop after it is decomposed. Adding 50 pounds of nitrogen to most grass or brassica cover crops may double biomass production if manure is not available. Adding a legume to the cover crop mix reduces the need for additional nitrogen fertilizer because the cover crops in a mixture share nutrients between species.

Tip 5: Most cover crops need a minimum of 1 inch of rain and at least 60 days of growth to survive the winter. Due to day length and soil temperature, planting or drilling even one week earlier is beneficial for establishing cover crops successfully.

Tip 6: Drilling is preferred to broadcasting seed to improve seed-to-soil contact and to improve germination. If you are broadcasting or flying on seed early, increase the seeding rate by 10 to 20 percent to compensate for reduced germination. Large seeded cover crops generally should not be flown or broadcast unless soils are really wet. For corn production, broadcast seed when

you can see 50% light penetration between the rows; for soybeans, when 25% of soybeans leaves are turning yellow.

Tip 7: Some early seeded cover crop failures are associated with herbicide carryover, especially when associated with triazines (Ex. Atrazine) and ALS herbicides (Ex. Pursuit and Scepter). If you are dissatisfied with cover crop stands in the fall that were broadcast and you had plenty of rain, chances are herbicide carryover may be an issue.

Tip 8: Use legume cover crops like crimson clover, winter peas, cow peas, red clover before corn to add 50-150 pounds of organic nitrogen or brassicas to aerate the soil before corn production. Minimize using high carbon to nitrogen ration cover crops that will need additional nitrogen to decompose. Remember, the corn is the last organism to utilize nitrogen, soil microbes and the soil organic matter will tie up most of the available nitrogen first, so the corn feeds last.

Tip 9: Legumes maximize their nitrogen production (90% complete) at blooming. Terminate legume cover crops before they set seed and tie up nitrogen. Most nitrogen in the legume cover crop will become available to next crop in 4-8 weeks once they decompose.

Tip 10: Add 40-60 pounds of nitrogen in corn starter to stimulate corn growth before soil microbes begin reproduction. Most soil microbes double their population with every 10 degree Fahrenheit increase in soil temperature. As microbial populations increase with moisture and warmer soils, nutrient recycling increases, and more nutrients are available for crop production. Long-term nitrogen studies show that almost 50% of N for corn comes from existing soil organic matter.

15 Additional Soil Health Tips for Growing and Managing Cover Crops

Tip 11: Microbes in the soil (especially bacteria) are considered soluble bags of fertilizer and directly feed the plant. There is about 1000-2000 times more soil microbes associated with live roots than bare soil. The plants supply 25 to 45% of their total carbohydrate root reserves just to feed the soil microbes because the microbes retrieve soil nutrients more efficiently than plant roots hairs.

Tip 12: Use grasses with fibrous roots like cereal rye before soybeans to maximize phosphorous uptake. Cereal rye control weeds through competition for light and nutrients and reduce diseases by keeping the soil drier due to transpiration (loss of water to the atmosphere) from actively growing cover crop plants.

Tip 13: If soil is too wet in the spring, let cover crops grow to dry the soil. If soils are starting to dry out, terminate the cover crop sooner and plant as soon as possible.

Tip 14: Let cover crop roots decrease soil compaction and improve soil structure. It may take 2-3 years, but soil structure improvements will be more permanent than doing tillage which destroys soil organic matter (SOM) and ruins soil structure.

Tip 15: Use cover crops to increase SOM, to protect the soil from erosion, and to improve nutrient efficiency. Each 1% SOM is associated with 1000# N, and roughly 100# of P, K, and S in the soil. The majority of the SOM comes from the roots, so growing two sets of roots (regular grain crop plus your cover crop) greatly increases SOM accumulation.

Tip 16: Plan to add 100 to 150#N in fertilizer, manure, or grow a legume cover crop to decompose the additional 0.1 to 0.15 increase in SOM from cover crop roots. Soil microbes feed first, SOM residue ties up N second, and corn roots feed third.

Tip 17: To check for poor soil structure and compaction, use a shovel. Look for soil layers and poor soil structure. Good healthy soil should crumble in your hand. In good soil, you should be able to push the shovel easily into the soil (even on our clay soils). For a good reference, go to a fence row that has been undisturbed and compare how the soil has changed by tilling the soil.

Tip 18: Water requirements for corn double with every 10 degree increase in temperature. At 75 degrees F, corn needs 1 acre-inch of water per week, at 85 degrees F, 2 acre-inches, and at 95 degrees F, 4 acre-inches of water per week. Increasing SOM increases your soil water holding capacity by 1-2 acre-inches of water per foot of soil.

Tip 19: Allelopathic effects come from cover crop leaves. To minimize problems before corn planting, cut or harvest above ground biomass to reduce toxins and add manure or nitrogen fertilizer to decompose these toxins. If you cannot harvest it, kill it early, and wait three weeks to plant corn.

Tip 20: The best weed fighters are Sorghum Sudan grass, radish, and cereal rye; which out compete weeds for sunlight and nutrients. Avoid tillage which replants weed seeds.

Tip 21: Most corn and soybean diseases like *Phytopthora, Fusarium, Phythium, and Rhizoctonia* are associated with saturated soils. Use cover crops to dry out the soil and reduce disease pressure.

Tip 22: To increase predators for destructive insects, plant blooming cover crops that flower in the summer and provide nectar to developing predators (buckwheat, sunflower, hairy vetch, red clover, or sweet clover). Predators also need long-term no-till and residue to survive the winter.

Tip 23: For forage production, use oats, cereal rye, and Sorghum Sudan grass. Fall planted oats with 50# N may produce 1-2 tons of forage before Christmas. Cereal rye plus fall and spring N can supply 4-5 tons forage in the spring (early to mid-May). Sorghum Sudan (SS) can produce 1-2 tons first cutting and 4-5 tons second cutting. Cut SS short first time to provide 5-9x more roots to improve soil structure.

Tip 24: After wheat or corn silage, always plant a cover crop to maximize sunlight capture. Apply manure in the fall and spring to maximize forage quality and quantity. Harvest before the crop is in the boot stage.

Tip 25 & Summary: Keeping soils covered with live plants mimics Mother Nature. Live plants supply the energy to keep soil microbes and soil fauna healthy.