Cover Crops: Manure’s Best Friend

Because cover crop roots and top growth act like a sponge to capture, contain, and reuse manure nutrients, they can be an effective way to retain soil nutrients and reduce fertilizer costs. Even if only 40 pounds per acre of nitrogen are retained, spring fertilizer costs can be reduced by $25 per acre by planting cover crops such as oats, oilseed radish or cereal rye. This article offers a rundown on how to get the most from cover crops.

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Forget the notion that cover crops are old-fashioned; they have never had so much to offer, especially for ground that will receive manure.

Roots and top growth act like a sponge to capture, contain and recycle manure nutrients. Consider the difference between soil surfaces after silage harvest compared to a field with a growing crop. After silage is harvested there is little crop residue and, regardless of the soil type, machinery and rain can pack the soil, making the surface hard and impermeable. Surface-applied manure may soak into the soil. But if it doesn’t, the next rain may carry the manure along the natural drainage patterns of the field. If the field drains toward a tile drain surface inlet, stream or ditch the mixture of rain water and manure could create a direct discharge that pollutes surface water. Injecting or incorporating manure will decrease that risk.

Consider a silage field with an established cover crop. The roots of the cover crop make the soil surface more permeable so water and manure nutrients are less likely to move over the surface. The top growth reduces runoff, overland flow and erosion. Manure nutrients that infiltrate will be taken up by the cover crop and held over the winter. These nutrients will be released the following spring in time for the subsequent crop to take advantage. Even if only 40 pounds per acre of nitrogen (N) are retained, spring fertilizer costs can be reduced by $25 per acre. And the savings increase when phosphorus (P) and potassium (K) values are included. Research shows that cover crops improve soil quality, add organic matter and reduce compaction. And, a green cover crop in late winter and early spring always makes a favorable impression on neighbors.

Planning Ahead Helps Overcome Challenges
The time and labor involved in establishing a successful cover crop can be challenging. The busy fall harvest leaves little time to plant a cover crop. Plan ahead. Know how many acres are needed to utilize all manure nutrients in the coming months. Order seed and be ready to plant when the time is right.

Surface-applied manure is vulnerable to runoff, especially during frequent winter and spring snow melts. Don’t apply manure on heavy snow packs. Right-to-farm guidelines specify that liquid manure should not be winter applied on slopes greater than 3 percent, and solid manures should not be applied on slopes greater than 6 percent. Select fields for spreading that do not slope to surface waters. If cover crops are not used or not well established, manure must be injected or incorporated.

Select the Right Cover Crop

Oats are sometimes used as a cover crop in the fall and need to be planted soon after silage harvest. Drilling oats improves germination and growth before frost. When oats are allowed to grow for 8 to 10 weeks before a killing frost, they can retain up to 75 pounds of N per acre (1). Because oats winter-kill they are not a problem in the spring for no till or minimum tillage systems.

Another cover crop that is excellent at recycling N is oil-seed radish (Raphanus sativas). Oilseed radish planted before September 1 can recycle 60 to 75 pounds of N per acre (2,3). Oilseed radish is a fast growing, non-legume broadleaf that will reduce winter annual weeds. It winter-kills in Michigan and is easy to manage in the spring.

Cereal rye is the best cool-season grass for capturing excess N. Because rye over-winters it can hold 25 to 50 pounds of nitrogen in the spring (4). It germinates at temperatures as low as 34 degrees so can be seeded later than oats, but less nitrogen will be recycled the later the rye is seeded. It will grow later in the fall and begin growth earlier in the spring than wheat. It will also provide excellent winter pasture or a green-chop in the spring. A potential disadvantage of rye is vigorous spring growth, requiring it to be controlled with herbicides or tillage before it gets tall and dries out the soil. Rye that is 9- to 12-inches tall can be controlled with 1 quart of glyphosate with ammonium sulfate per acre in the spring.

Harvested silage fields will benefit from spreading rye or wheat with a bulk spreader either just before or just after the manure is applied, and then using a shallow tillage tool to incorporate both the manure and cover crop seed. Rye and wheat are fairly forgiving of seeding depth, especially when cover, not yield, is the goal. Wheat, oats, and rye should all be seeded at about 2 bushels per acre.

In some areas of the state aerial seeding may be an option. This allows planting earlier as the seed can be flown into standing corn (at early dent stage) or soybeans (just ahead of leaf drop). Do not sow treated seed into a standing crop because there is a risk of contaminating the harvested crop.

Slurry seeding, or adding cover crop seed directly into the manure tank and then applying with a low disturbance tillage tool has shown excellent success in establishing cover crops in MSU trials (5).

Remember, cover crop seedings do not have to be perfect. The goal is not yield per acre but nutrient recovery and environmental protection per acre. For more information on cover crops and slurry seeding, visit <http://www.animalagteam.msu.edu or www.covercrops.msu.edu>.

References