It begins with you: Incorporating cover crops into your corn-soybean or corn-corn system

Cover crops are the small grain or legume “green” crops that are seeded in early fall to protect and improve water quality during the “brown” winter months. This extended period between harvest and planting without living plants on the ground leaves precious soil, water and nutrients exposed and unprotected from erosion and leaching. With increased awareness and education, farmers are seeing the value of cover crops and are incorporating them into their corn-soybean and corn-corn rotations.

Let’s take a closer look at some frequently asked questions about cover crop best management practices.
Cover Crops in Iowa

Cover crops that work well in Iowa include winter hardy cereal grain species that grow in fall and again in spring:

- winter rye
- winter wheat
- winter triticale
- hairy vetch.

Non-winter hardy oats work well in Iowa after soybean crop.

Q: What cropping systems or management practices are compatible with cover crops?

A: Cover crops can be added to any farming system, but fit best with no-till, strip-till, or spring tillage-only systems because they give the cover crop a longer growth period. Options for cover crops are expanded when they are planted after mid-summer harvest of small grains such as oats or wheat because plenty of growing season remains to seed legume cover crops such as clovers or brassicas. However, small grain cereal crops like oats or winter-hardy rye, wheat, and triticale can be established in early September after corn silage, seed corn or vegetable harvest. Winter-hardy cereal grain cover crops can be grazed in late winter/early spring to supplement livestock feed.

Q: Can cover crops be added to a corn-soybean or corn-corn rotation that is harvested for grain rather than corn silage?

A: Yes, but recognize that adding a cover crop to these systems is not business as usual; success will require a higher level of management. The greatest management issue is timing of fall establishment and spring termination. Cover crop management is a balance between maximizing their benefits such as reduced soil erosion and nutrient capture while minimizing the risk to the corn or soybean crop.

Q: What cover crops are recommended for planting in Iowa?

A: The most reliable choices for a corn-soybean rotation include spring oats seeded or broadcast into standing soybean when the leaves begin to yellow and winter-hardy rye drilled after corn harvest, ideally before mid-October. Winter-hardy cereal grains include rye, winter wheat and triticale. In central Iowa, winter rye has proven to be the most cold tolerant and capable of surviving winter conditions. Some winter wheat and triticale varieties do not survive the harsh Iowa winters.

Farmers ask about adding legume cover crops to fix atmospheric nitrogen for corn. There has been limited success establishing legume cover crops north of Interstate 80 unless it is drilled in mid-late summer following small grain harvest. The legumes must be planted before early September or they tend to winter-kill. Unfortunately, aerial seeding legumes into standing corn or soybean has had very limited success. Hairy vetch may be an exception, because its good winter hardness and its vine-like growth helps it survive under crop canopies and field traffic during corn or soybean harvest. There is potential for aerial-seeding a mix of oats and hairy vetch into standing soybeans.

Q: Do cereal grain cover crops differ in their ability to reduce soil erosion?

A: Research at NLAE suggests that winter rye cover crops can reduce soil erosion up to 90 percent and non-winter hardy oats can reduce soil erosion up to 50 percent, compared to no-till cropping systems without a cover crop. Establishing the cover crop early in the fall and delaying spring termination provides maximum soil erosion reduction benefits.

Q: Are there corn or soybean yield reductions with cover crops?

A: There is little risk for soybean or corn silage yield reduction following winter-hardy cereal grain cover crops, but there is a risk of corn grain yield reduction. Good management choices help to minimize the risk of decreased corn grain yields:

- Seed oats, which winter-kill, before corn; seed winter rye before soybean for the lowest-risk approach.
- In the spring before planting corn, terminate a winter-hardy cereal grain cover crop when it reaches a maximum height of 6 inches and at least 10-14 days before planting. If soil conditions are dry or the spring long-range weather forecast predicts less-than-normal rainfall, terminate the cover crop as soon as possible.
- If you use a grain drill to plant a winter-hardy cereal cover crop, use a skip-row pattern, not seeding the cover crop in the rows where next year’s corn crop will be planted.
- Spring growth of over-wintering cereal grain cover crops and decomposing cover crop residue may compete for nitrogen fertilizer with a follow-up corn crop, therefore, use a starter nitrogen fertilizer for corn following cereal grain cover crops. If total nitrogen rate is to be less than 150 lbs/acre, increase the application rate by 10-15 lbs/acre. Consider side-dressing nitrogen fertilizer during early corn vegetative growth stages.
- Increase corn seeding rates following winter-hardy cereal grain cover crops, final (harvest) corn stands at or above 32,000 plants/acre reduce the potential for corn grain yield loss. Small grain cover crops, particularly winter rye, can increase corn seedling mortality and reduce corn stands.

Q: Is it better to seed cover crops after cash crop harvest or aerial seed before harvest to increase fall cover crop growth?

A: It is clear that earlier fall seeding of over-wintering cover crops results in more fall and spring growth. However, establishment of aerial-seeded cover crops is dependent on rainfall after seeding. If pre-harvest cover crop establishment via aerial or high clearance drop seeder is not possible, post-harvest grain drill or broadcast seeding with shallow incorporation may be possible only on soybean or the earliest-harvested corn acres. Late fall or early spring aerial seeding or early-maturing soybean varieties or corn hybrids and be ready to plant cover crops as soon as possible.

Aerial seeding of cover crops is most successful after soybean leaf yellowing or corn black layer because crop water use decreases rapidly after that time. In central Iowa, it is recommended to aerial seed non-winter hardy cover crops, such as oats, before September 15. Winter-hardy cereal grains such as rye, wheat and triticale should be aerially seeded before October 15.

Q: How late can I seed a cover crop in Iowa and still achieve a reasonable stand?

A: Research in central Iowa indicates that November 1 is that latest date that winter-hardy cereal grains can be drilled or planted with shallow tillage to obtain reasonable growth and some cover crop benefits. It is estimated that the latest planting date would be about a week earlier for northern Iowa and a week later for southern Iowa. To be eligible for Iowa NRCS cover crop cost-share funding, however, non-winter hardy cover crops must be seeded by September 15; winter-hardy rye, wheat, or triticale must be seeded by October 15.

Q: Do cereal grain cover crops compete with cash crops?

A: Cereal grain cover crops can be grazed into late winter/early spring to supplement livestock feed. For example, the Nebraska Conservation Reserve Program has passed a rule allowing farmers to graze cover crop acres. Grazing may help maintain forage quality for late winter feeding.

In Iowa, there are multiple groups working to promote the use of cover crops as a conservation tool, including:

- Iowa Learning Farms
- Practical Farmers of Iowa
- Natural Resources Conservation Service
- USDA-Agricultural Research Service
- Iowa Department of Agriculture and Land Stewardship
- Midwest Cover Crops Council

Cover crop benefits

- reduce erosion even in no-till
- reduce nitrate leaching
- increase soil organic matter
- improve soil health, quality and productivity
- suppress winter annual and early season weeds

Conservation tool, including:
Q: What are recommended cover crops seeding rates?
A: Generally, when drilling a winter small grain cover crop, one bu/acre is adequate. The seeding rate should be increased for later seeding dates or when aerially seeding. If you are planning to graze the cover crop, increase the rate by 50 percent. For oats, a seeding rate of two-three bu/acre is adequate.

Q: Are there any issues with crop insurance coverage of my corn or soybeans if I include cover crops?
A: Generally in Iowa, crop insurers do not require any additional or special provisions for corn or soybean coverage following cover crops as long as the cover crop is terminated in the spring before it reaches the heading/bud/flowering growth stage. Crop insurers allow grazing but not machine-harvest (chopping or baling for hay) of an overwintering small grain cover crop. Check with your individual crop insurance agent to address specific questions about cover crop management.

Q: What are the options for spring termination of over-wintering cereal grain cover crops?
A: Glyphosate and sethoxydim herbicides at labeled rates effectively kill spring regrowth of over-wintering cereal grain cover crops. To minimize the risk of corn grain yield loss, terminate the cover crop before it reaches six inches in height. When soybean is planted into winter rye, researchers have seen minimal yield effect regardless of cover crop termination timing—even planting soybeans into living winter rye. Spring cover crop termination in organic systems typically includes a combination of tillage passes. Small grain cover crops can be killed by using a roller-crimper or mower to break or cut the stems once the seed heads have emerged (past “dough” growth stage). If maturity of the cereal grain plants is uniform, either mowing or crimping will kill the cover crop and provide residue/mulch into which soybean can be planted. Remember, however, the crop insurance coverage limitations associated with delaying termination of the small grain cover crop past the seed head stage.

For more information
Contact your area Iowa State University Extension field agronomist, local NRCS field specialist or Practical Farmers of Iowa for more information about cover crop management.