

Corn Talk News

RESEARCH UPDATE



CORN TALK NEWS
PENNSYLVANIA MASTER CORN GROWERS ASSOC., INC.

MANAGING COVER CROPS FOR CONSERVATION TILLAGE

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Cover crops are crops seeded to provide a soil cover or barrier from soil erosion. In addition, cover crops can improve the soil by adding organic matter, nutrients, and stability, and act as scavengers to trap leftover nutrients that otherwise may leach out.

Cover crop uses include ground covers, mulches, green manures, nurse crops, smother crops, and forage and food uses for animals or humans. Cover crops can be annual or perennial species including certain legumes, grasses, and non-leguminous dicots.

An understanding of the cropping system is necessary for selecting the proper cover crop. Characteristics important for cover crop selection include life cycle, seeding date and rate, winter hardiness, nitrogen fixation or scavenging ability, feed or forage value, and establishment costs.

There is no single cover crop or system that will provide all benefits. Therefore, experimentation may be necessary before identifying suitable cover crop(s) for an individual system.

Management of the cover crop is critical for deriving the benefits and minimizing potential problems that may arise. Planning the management strategy well in advance will assure the greatest success.

Management of Cover Crops Preplant Considerations

Prior to cover crop establishment, several factors must be considered. Soil fertility is an important consideration in any cropping system. A reliable soil test which determines the nutrient limitations of a soil including pH is a good place to begin the planning process.

If certain nutrients are limiting, follow soil test recommendations for the primary crop, keeping in mind that high fertility will also maximize cover crop growth.

Another important consideration is the pest history of the field. In general, additional pest management inputs are not necessary when utilizing cover

crops. However, as with any crop, pests can become a problem in the cover crop system. If possible, select fields that have minimal pest problems when establishing the cover crop.

Since there are generally crop/pest associations such as alfalfa or clover and leafhopper or winter small grains and winter annual weeds, these pests can also become a problem in the newly planted cover crop within a cropping system.

Consider the herbicide applied the previous season. Certain herbicide residues can carryover and injure sensitive rotational crops. If these residues have not dissipated before a sensitive crop is planted, injury or death of the cover crop may occur.

Herbicides including atrazine and simazine can injure both grass and legume crops and several of the herbicides belonging to the sulfonylurea and imidazolinone families persist and can injure legumes. Always refer to current crop protectant product labels to be certain of crop rotation restrictions or other limitations before establishing any crop.

Establishment Options

Several options exist for seeding cover crops, including conventional, no-till, or broadcast seedings.

Good seed-to-soil contact is necessary for proper germination and emergence. (When broadcast seeding, increase the seeding rate for proper stand establishment.)

In general, using preplant tillage to prepare the seedbed, controlling weeds, and disrupting insect and disease life cycles improves cover crop establishment.

Conventional seedbeds are prepared by plowing, disking, and harrowing the soil prior to seeding. Seeding depth depends upon the species being sown. Generally, for most cover crops, small-seeded legumes require shallow seed placement (¼ inch), while larger seeded legumes and small grains are generally planted 1 to 1½ inches deep.

No-till seedings can also be successful, but planting equipment as well as potential pest problems must be considered. Excessive plant residues can hinder uniform planting and interfere with seedling development. However, a no-till drill that places the seed at the proper depth and allows good seed-to-soil contact is an excel-

lent seeding option.

No-till seedings are best suited for areas where soil erosion is a concern. Be sure to control live vegetation at planting time with an appropriate burndown herbicide application (e.g., Roundup).

Broadcast seeding may also be acceptable, although this is often the least successful method. Small-seeded species such as the clovers tend to establish better by broadcast compared to larger seed species. Several broadcast techniques and timings may be utilized.

Surface seeding with a drop-type or cyclone-type seeder provides a uniform distribution of seed. For larger areas, aerial seeding by fixed-wing aircraft or helicopter in late summer during crop die down can be effective. As the leaves of soybean plants drop off, they act as a mulch by covering the seed and allowing for retention of moisture and soil protection.

Another broadcast seeding method is frost-seeding, which occurs during late fall or early spring when the ground is honeycombed. This allows the seed to fall into the cracks and germinate when the temperature rises in the spring. Cover crop seeding at layby or last cultivation has generally not been successful.

Suppression or Control of Cover Crops

Cover crops that interfere with growth of the primary crop defeats their benefits. Effective control or suppression of the cover crop is generally necessary before emergence of the main crop.

Commonly used methods include tillage, mowing, herbicides, or selection of species that winterkill or have a short life cycle.

Tillage not only controls but incorporates cover crops into the soil allowing them to degrade quickly and release nutrients for the primary crop. An example of this would be a cover crop used as a green manure.

Moldboard plowing is often necessary if large amounts of cover crop biomass are present. Chisel plowing followed by disking may be inadequate for certain cover crops such as cereal rye if large amounts of residue are present.

Mowing can successfully control certain covers prior to planting the primary crop if timed properly. Mow hairy vetch when the first purple flowers are visible. Mowing vetch prior to flowering can fail to provide adequate control and result in both crop competition and the production of vetch seed which could affect future small grain production. Mowing vetch after pod formation may result in viable seed production which may impact the primary crop.

Mow cereal grains after heading to insure successful control. Mowing prior to head emergence will likely result in regrowth from tillers. Regrowth from cereal grains harvested for forage in the boot stage of development is a common problem for producers that do not use an appropriate herbicide program.

Certain crops such as oats can be either mechanically incorporated or mowed after heading or can be used as forage.

Pasturing with animals or cutting for hay or silage are viable ways of utilizing cover crops for other means besides soil improvements. Species which have short life cycles or are not winter hardy may also be a means by which cover crops are controlled. Generally,

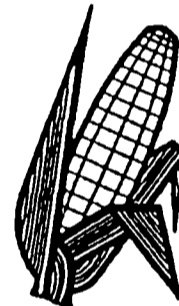
crops which are planted in the fall, produce vegetation, and are killed by cold temperatures in late fall/early winter provide adequate ground cover and are effective in conserving and improving soil as well as holding moisture. Be aware that winter kill occasionally may not occur.

Control or suppression of cover crops can be done effectively with herbicides. In addition to product selection, application timing is important. In general, make herbicide application at least one week ahead of planting. This insures complete kill as well as some dry-down of the cover crop prior to planting the primary crop.

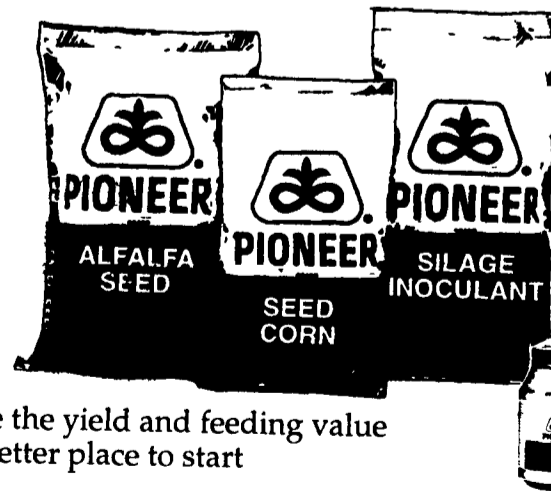
Several options exist for managing cover crops with herbicides. See the individual commodities sections within the Penn State Agronomy Guide or other related publications for more information about product selection.

Proper management of the cover crop will ensure its success. Plan the establishment and control strategies well ahead of time.

Be aware of potential limitations and problems that can arise with cover crop management systems. Keep expectations reasonable and adapt the management strategy when necessary to reduce potential problems and capitalize on the benefits.



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