

Cover crop investigation: PFI farmers turn “undercover” agents *by Sarah Carlson*

PFI farmers have been experimenting with cover crops since PFI's Cooperators' Program formally began in 1987 with PFI farmers seeking solutions to their on-farm challenges by conducting on-farm research and demonstration projects. Today, there is renewed interest in cover crops.

Several PFI Cooperators have tested adding winter rye, hairy vetch, oats and other cover crop species to their farms to reap the benefits that cover crops provide for the farming system and the surrounding environment through reduced soil erosion, improved nutrient holding and cycling, and pest and weed suppression.

Summaries of two PFI Research Reports published in 1988 and 1989, below, illustrate the commitment of PFI's farmers to finding answers to their on-farm questions.

Cooperators' cover crop discoveries of the 80s

How will cover crops affect my crop yields? Mark May of Wilton, Iowa, was studying the effects of cover crops on his corn yields while Allyn Hagensick studied cover crops' effects on soybean yields.

It was very dry in 1988, following a drought in 1987, and there were some very real concerns about a possible negative effect of cover crops robbing moisture from the main crop in extreme dry conditions; however, as dry as it was that year, Mark and Allyn did not see this negative impact.

Mark reported that he was pleased with unchanged corn yields following a hairy vetch-oats cover crop. Allyn reported that he saw neither an increase nor a decrease in his soybean yields with cover crops he'd planted in north central Iowa in that dry year.

The following statement concluded their research report: “We shouldn't let one potential negative over shadow the many positive aspects of reducing soil erosion, decreasing weed pressure, improving soil

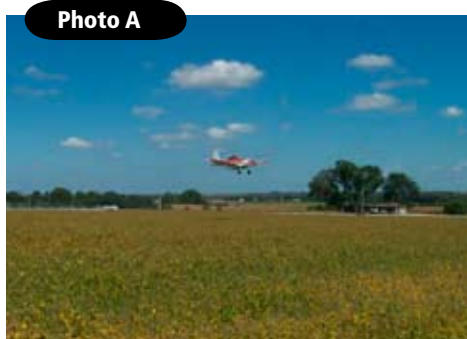


Photo A
A plane aerially seeds cover crops into yellowing soybeans in southwest Iowa on the farm of Steve McGrew.

structure, increasing earthworms, and catching moisture and nitrogen that would otherwise be lost.”

As a result, more trials were planned for 1989 to determine how best to add cover crops to a farm system. Two

high boy applicators were used that fall for cover crop experiments. The ground applicators gave more precise seeding for plots than airplane seeding. PFI cooperators also built an over-seeding rig from a used high-clearance tractor to sow cover crops cheaply and before cash crop grain harvest. Another important cost-cutting measure was the production of cover crop seed right on the farm. Cooperators also explored using airplanes or ground equipment to improve cover crop growth by moving up its planting date.

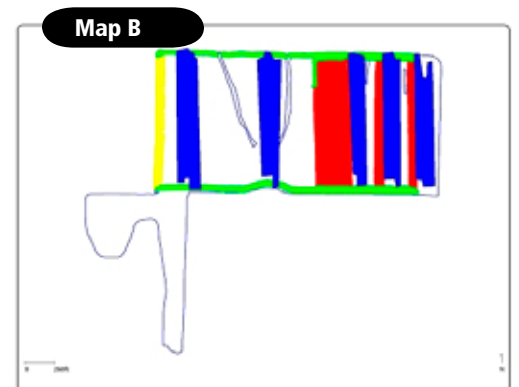
A renewed interest in cover crops today

There is new momentum for cover crops because they hold onto valuable top soil made all the more important today in light of increased precipitation levels in Iowa. PFI farmers and staff have been invited to speak about cover crops at events that have reached more than 500 farmers this year and last. Already in 2011, we have assisted 80 farmers interested in adding cover crops. In response to this growing interest, PFI created a **Cover Crop Business Directory** to help members and others find seed sources, pilots who can over seed cover crops and cooperatives

or other custom applicators who can help manage the cover crop in the spring while farmers are busy planting other cash crops.

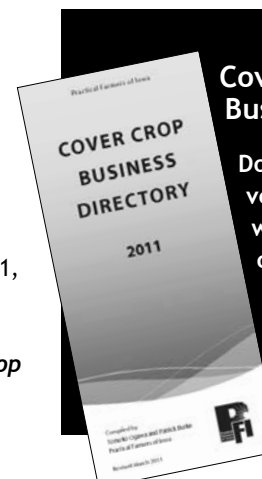
Comparing aerially seeded cover crops versus drilled in 2010

Last year PFI member Steve McGrew used aerial seeding to plant cover crops into yellowing soybeans on his farm in southwest Iowa (Photo A). He compared aerially seeded (Photo D) versus drilled cover crops of hairy vetch (Photo E), tillage radish and rapeseed into standing soybeans and following soybean grain harvest. He aerially seeded 15# hairy vetch + 3# tillage radish + 2# rapeseed on September 14, 2010 (Photo E). Within



Target Rate(Mass) (lb/ac)	Dataset - Name
■ aerial (22.85 ac)	■ drill strip (12.193 ac)
	■ drill west (1.571 ac)
	■ drill end rows (4.900 ac)

seeded 9/14/10 seeded 10/6/10



Cover Crop Business Directory

Download the latest version at: <http://www.practicalfarmers.org/assets/files/fieldcrops/additional/CoverCropDirectory.pdf>.

Photo C



Tuber growth and above-ground biomass
 This photo shows growth samples of two different brassicas and the aerial versus drilled planting date and planting type comparison.

three days, he received almost an inch of rainfall. The pilot flew on cover crop strips with “skips” and then on October 6, 2010, following soybean harvest, Steve returned to the field and planted the drilled cover crop mix treatment (Photo E). Check out a map of Steve’s on-farm project (Map B).

After planting the treatments, Steve monitored cover crop growth. He collected a sample of the brassicas in the different treatments to view tuber growth and above-ground biomass (Photo C).

The aerially seeded treatments were much bigger than the drilled treatments. Steve harvested biomass in early December 2010 to estimate how much effect planting date

Right: mid-November 2010 photo of September aerially seeded treatment.

Photo D



Photo E



Left: Picture taken mid-November 2010 of October drilled treatment.

and type had on the cover crop growth. On average the aerially seeded cover crop mix yielded 43# biomass/A (Photo D) versus 28# biomass/A (Photo E) in the drilled treatment. “The hairy vetch was looking okay but the brassicas were beginning to become mushy following a hard freeze around this time,” says Steve. In addition to the side-by-side comparisons on a nearby field, Steve also hand planted (Photo F) the mix on the same day as the aerial seeded treatment to compare the type of planting. Steve says the September hand-planted site was 10 times larger than the aerially seeded cover crops planted on the same day (Photos F & G). At this time the aerially seeded crops were also five times larger than the October drilled treatment (Photos C).

In the spring, the brassicas had died but the hairy vetch was still present. On April 27, 2011, above-ground biomass samples were collected. A full research report will be made available from Steve’s project. A key observation from Steve’s project was discussed at the February Cooperators’ Meeting in Ames. Farmers were concerned about the accuracy of aerial-seeding and the presence of “skips” or missed areas where cover crop seed does not hit the ground because of issues with the plane’s GPS or wind. They also wanted to know how to improve soil-to-seed contact when

over seeding into a standing crop. Several PFI members discussed modifying a highboy or detasseling machine to either broadcast cover crop seed over the crop canopy or use the boom of a high boy to funnel seed into drop-down tubes that would place seed within the crop canopy and closer to the ground.

Over seeding planting rate suggestions

If you over seed cover crop seed into a standing crop make sure the seeding rate is increased by 50 percent.

- Small Grain 1.5bu/A-2bu/A
- Vetch 20-30lbs/A

Photo F



Above: Picture taken mid-November 2010 of September hand-planted demonstration site.

Photo G



Above: Picture taken mid-November 2010 of tuber from September hand-planted demonstration site.

- White clover 5-10lbs/A
- Red clover 10-15lbs/A

Would you like to borrow PFI’s highboy for on-farm testing?

Contact Sarah Carlson, sarah@practicalfarmers.org or 515.232.5661, to borrow PFI’s highboy (shown below), or to tell us of ways you’ve modified a highboy or other over-seeding equipment to improve soil-to-seed contact.



PFI’s modified highboy has a broadcast seeder mounted on the front to seed over the canopy. It is on a car trailer and can be pulled easily by any truck with a ball hitch. It is FREE and available for any farmer to borrow to test over-seeding cover crops on your farm.