Potential of Interseeding Cover Crops in Corn While Sidedressing and Applying Postemergent Herbicides

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A number of changes in agriculture and cropping systems in our region have created an opportunity to evaluate the potential of interseeding cover crops in corn (Zea mays L.) and other crops.

Increased corn production, a decline in traditional dairy cropping systems, higher N costs, and higher feed costs create more potential for the production of interseeded relay crops to offset the impacts of continuous corn, to reduce crop N requirements, and to potentially increase feed production.

There is an increasing need to reduce nutrient runoff and leaching associated with animal production in the Chesapeake Bay watershed and cover crops are one potential tactic.

Traditional cover crops are mostly adapted to corn harvested for silage and often corn harvested for grain is harvested too late to establish functional cover crops. Also in short season areas, cover crops can be difficult to establish even following silage.

Cover crop seeding with aerial application methods has been inconsistent in our region. Traditional cover crop planting with a no-till drill is successful, but requires an additional trip across the field.

If cover crops could be established while sidedressing N and/or applying postemergent herbicides, then it could be possible to reduce the cost of cover cropping and with the appropriate species, address some of the issues emerging in cropping systems in the region and reduce the environmental impacts of agriculture.

The overall objective of this program is to evaluate the potential of interseeding in no-till and tilled corn fields by documenting the success of various species in a range of environments.

Materials and Methods

Experiments and demonstrations were conducted during 2010 and 2011, at the Russell Larson Agricultural Research Farm near State College, PA and at numerous on farm locations.

In 2010, two field experiments were established to evaluate annual ryegrass, red clover, white clover and an annual ryegrass/red clover mix interseeded at the V6 stage of corn while applying sidedress N and Roundup in a post directed application. In 2011, demonstration trials were conducted on 6 farms to assess the potential of cover crop establishment of various species and a complex mix of ryegrass, white, crimson, red and sweet clover. We also conducted an N rate trial superimposed over one of the 2010 studies to assess potential yield and N impacts of the cover crops.

Research Results- 2010 and 2011

In 2010 both trials had fair to good cover crop establishment for most species (Figure 1). Cover crops had no impact on corn yields in either study in 2010. Cover crop yields in late October ranged from 101 to 591 kg/ha with the ryegrass and ryegrass/clover mixtures the most consistent. (Table 1)

In the field that was previously in soybean, the interseeded cover crops were allowed to grow after corn harvest and were sampled again in the spring (May 9, 2011) prior to planting corn again. Cover crop biomass in the spring ranged from 896 to 1,680 lb/a (Figure 1). This corn crop was side-dressed with 100 lb N/a and yield was measured at harvest.

Table1. Impact of interseeded cover crops on corn yields and cover crop biomass.

Cover	Rotation	Grain Yield	Fall Cover Crop Yield	Spring Cover Crop Yield	2011 Corn Yield
		Mg/ha	kg/ha	kg/ha	Mg/ha
Red Clover	C/C	9.1	101	251	
White Clover	C/C	9.4	305	327	
Red Clover/Rye Grass	C/C	8.6	591	890	
Rye Grass	C/C	8.9	473	760	
Check	C/C	9.2	-	-	
LSD (.05)		ns	367		
Red Clover	C/SB	10.3	243	890	5.8
White Clover	C/SB	10.5	477	805	5.5
Red Clover/Rye Grass	C/SB	10.5	542	646	6.4
Rye Grass	C/SB	10.5	413	1621	6.0
Check	C/SB	10.3	-		5.5
LSD (.05)		ns	419		ns

Demonstration Program

Overall the demonstration program was quite successful, with fair to excellent establishment of cover crops on the six cooperating farms with fall biomass yields as high as 2700 kg/ha. (Figure 2) In some cases under severe drought or heavy corn crops establishment of the ryegrass was limited. In those cases, inclusion of crimson clover proved beneficial. We did not observe much establishment of the white or sweet clovers present in the seed mix. On two of three of our research station sites, severe drought and shading resulted in no establishment of either ryegrass or clover. It appears that mixtures of several species can increase the likelihood of a successful establishment. Overall, we have had fair to good establishment at about 80% of the sites.

Figure 2. Examples of successful crimson clover (left) or ryegrass/clover (right interseedings

Figure 1. Fall cover crop establishment (left) in the 2010 trial and subsequent spring biomass in late April.

Conclusions

Interseeding cover crops can be successful in our region, and provide cover cropping environmental benefits to short season areas or following corn grain production. More research is needed to improve the consistency of establishment with different species, seeding rates, timing or other management factors. Potential economic returns can be significant if interseeding could result in additional forage, higher corn yields or less N fertilizer inputs. Interseeded cover crops could also help to replace soil carbon where residue is removed.