

An Evaluation of Fall Planted Broad Leaf Cover Crops on Muck Soils

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Many onion fields have been in continuous, unbroken production for decades. Insect and disease populations build up when no rotation is employed. Over the last few years, onion bulb mites have increased as a problem. It is felt the mites over-winter on the traditional grass cover crops of oats and barley. This study was an attempt to evaluate fall planted broad leaf cover crops. The fall planted covers we looked at were annual crimson clover, field peas, yellow mustard, hairy vetch and buckwheat. Two growers in the onion growing region of Orange county and one grower from Oswego agreed to supply the muck-land and carry out the trials. Fields were one acre, divided into one-fifth of an acre plots. We evaluated ease of establishment, root depth and bio mass. We will look at volunteer weeds and trash levels next spring. Prof. Dick Straub was provided seed and will evaluate these crops as over-wintering hosts for bulb mites. Prof. Straub's results will be ready for the winter meetings.

Background and Justification

Onions are a high value crop. Many fields in Orange County have been in continuous, unbroken onion production for 50 years or more. Growers agree there is a need to find a rotational crop to break the insect and disease cycle. There are approximately 6000 acres of muck onions grown in Orange County. With the fear that bulb mites over-winter on the traditional fall cover of barley or oats, many onion growers are not planting fall cover crops. This leads to soil loss from wind erosion. Sorghum sudangrass (Sudex) has been evaluated in rotational studies, but not all growers feel Sudex is the answer for their operations. We have looked at lettuce, spinach and potatoes as rotational options in 1998. Pest levels were studied in our comparison plots for rotational impact on insect and disease levels. The 1998, early season data for mites, smut or maggot damage was not collected because of the severe hail storm. Scouting and evaluation began in early July. We did find in four out of five comparison plots, black mold was higher in non-rotated fields than rotated fields. Vigor was also increased as stand counts and yields were higher in rotated fields. While lettuce, spinach and potatoes may work well as rotational crops, they are not an option for many onion growers and they do not work as winter cover crops.

The disease and insect cycle needs to be broken by some crop and the reason annual crimson clover, field peas, yellow mustard, hairy vetch and buckwheat were selected for evaluation is because they each have strengths. There may not be a “silver bullet” rotational cover but by looking at different crops, it is possible a specific crop may work for a specific grower.

Objectives:

- 1 - To increase the onion growers ability to make sound cultural and economic rotational crop decisions.
- 2 - Evaluate annual crimson clover, field peas, yellow mustard, hairy vetch and buckwheat for ease of establishment, root depth, bio mass and trash levels the following spring.
- 3 – Crops that perform best will be chosen for whole field evaluations the following year.

Procedures

The first Orange County Field was planted August 30, 2001 (field one). The second Orange County field was planted September 4, 2001 (field two). The third field was planted in Oswego County on September 21, 2001 (field three). For all trials, a one acre field was divided into five plots. Each plot was planted to one of the trial covers at the recommended rate. The recommended rates are:

Crimson Clover	25 lbs./acre
Field Peas	200 lbs./acre
Hairy Vetch	40 lbs./acre
Buckwheat	60 lbs./acre
Yellow Mustard	8 lbs./acre

Results

Field one – Orange County

Rain was a significant factor in this trial. Conditions were very dry this past fall. Field one was fortunate in receiving a nice rainfall immediately after planting. All the covers jumped up. The grower was particularly impressed with the yellow mustard. It came up immediately and grew very quickly. The field was evaluated on October 9, 2001. At that time, the three covers that looked the best were the yellow mustard, buckwheat and the field peas. The hairy vetch and crimson clover did not establish very well and looked as if they needed to be planted earlier. A killing frost occurred on October 10, 2001. The field peas kept growing, staying green till snow cover occurred. The other covers frost killed. The yellow mustard and buckwheat did develop nice top growth and while they did frost kill, they did provide a good mat to hold the muck soil against wind erosion.

Field two – Orange County

Field two was planted September 4, 2001. It did receive moisture before planting but did not have rain for two weeks after planting. It was slow to emerge. Again, the three covers showing the most top growth were the yellow mustard, buckwheat and the field peas. They did not grow as tall as those in field one but still did develop significant top growth. Like field one, the field peas continued growing late into the fall.

Field three – Oswego County

Field three in Oswego County was planted September 21, 2001. It received a light rain after planting but did not receive much rain from then on. The buckwheat came up but did not grow because of the dry conditions. Unlike the Orange County fields, the fall frost were light and the crimson clover, hairy vetch, yellow mustard and field peas continued growing well into the fall. The grower was particular impressed with the speed of emergence of the yellow mustard. It was up in a couple days and grew better than the other covers. They performed well holding the muck soil against winter wind erosion. Measurements were not taken on the Oswego cover crops.

	<u>Planting date</u>	<u>top growth</u>	<u>root length</u>	<u>cost per acre</u>
Field one	8/30/01			
Field peas		12"	6"	\$150-200
Hairy vetch		7"	5"	\$140
Yellow mustard		21"	5"	\$6
Buckwheat		16"	5"	\$32
Crimson clover		2"	4"	\$80
Field two	9/4/01			
Field peas		8"	5"	
Hairy vetch		3"	2"	
Yellow mustard		13"	4"	
Buckwheat		8"	4"	
Crimson clover		2"	3"	

Conclusions

All the participating growers were surprised at how well the cover crops established in the fall. The growers were also happy someone was looking at this aspect of production and were looking forward to how well the onions performed after each particular cover. The major concerns for the growers were spring trash and volunteer weeds. The field peas grew well into the fall and established a large amount of bio-mass. The yellow mustard produced a carrot like tap root. While it will help in hard pan breakup, we will evaluate if it will cause a trash problem with the small seeded onion planting. Mustards are a serious weed for onion growers. While the yellow mustard used in this trial is not

the same as the weed species, growers were still weary. Yellow mustard needs long days and warm temperatures to produce seed. Planting the yellow mustard when we did in the fall was giving it short days and cool temperatures. Just the opposite of what it needs for seed production. We will look at the weed and trash aspects next spring. We will also evaluate onion performance following the specific covers.

Fall is a busy time of year for onion growers and they are deep into harvest. Grass cover crops are the traditional option for fall establishment. If it is true that mites prefer grass species for winter carryover, than a broadleaf cover crop is needed. The covers chosen for this evaluation were picked because of their ease of establishment. Hopefully we can find a good fall cover to give growers an economic and effective rotational cover crop.