Utilizing legume winter cover crops

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A study of using winter cover crops for nitrogen production or storage was started to see if it was feasible and what management techniques would be needed. From previous trials, the results had been variable, mainly because of late planting date. This study looked at planting date, seeding method, and variety of cover crops. Location was at Geff, Illinois, which is located between I-70 and I-64 in southeastern Illinois. The Terry Taylor farm was the site and several fields were utilized. Three planting dates were used; September 2nd was simulated aerial seeding; September 10 and October 2nd , the planting method was no-till drilled. The September 2 planting was into standing "green" corn, the September 10 site was into a prevented planted field, and the October 2nd date was no-tilled behind a very early harvested corn crop (28+% moisture) that yielded 180 bushels/acre.

The cover crops utilized were:

Austrian winter pea	30#/a
Mihi Persian clover	10#/a
Dixie Crimson clover	10#/a
Common Crimson clover	10#/a
Vkaup hairy vetch	15#/a
VF-1 Forage First hairy vetch	15#/a
Groff hairy vetch	15#/a
Pennington Vp-07 hairy vetch	15#/a
Pennington Vp-08 hairy vetch	15#/a
Albert Leah hairy vetch	15#/a
Odsessay Persian clover	10#/a
Chickling vetch	15#/a
Subterranean clover	10#/a
Oil seed radish	15#/a
Canola	10#/a

Summary: **This is only 1 year data**

The early planted aerial seeded cover crops did not do well due to the corn being so green and no sunlight hitting the soil. Most seeds germinated and then did not survive the shading. This is an important point to remember, most successful aerial seedings occur when the corn has already started turning brown and you can see significant sunlight on the soil surface. This plot was done early due to the date of planting study, otherwise the seeding would have been done later when the corn had started browning which was in October. All the above varieties were seeded. The results were that Pennington Vp-08 had about a 30% stand on May 12th and Dixie Crimson clover has about a 10% stand. None of the other cover crops survived the planting into green corn other than scattered plants.

The September 10 planting had the best growing conditions. The following chart will give the results as of April 1, 2009 % stand

albert leah vetch-Minnesota	45
chickling vetch-	0
aus.pea	15
odessay persian	20
subclover	10
crimson clover	80
mihi persian	70
canola	30
Dixie crimson	85
oil seed radish	0
vkaup vetch- Kansas	67
groff vetch-Penn.	80
vf-1 Forage First	35
Penningtonvp-08 inoculated -Oregon	78
Pennington vp-07 inoculated-Oregon	83
Pennington vp-08 -Oregon	85
Pennington vp-07 Oregon	80

Chickling vetch is not winter hardy and although planted early never established a good stand and did not produce a measurable amount of top growth. The oil seed radish normally winter kills, produced roots only 3" x ¼" and all residue was completely gone by April 1.

The plots were harvested May 12th, and the nitrogen levels measured. Some significant observations: VF-1 actually started blooming in mid-April, Albert Leah was early May , and the other vetches were <10% bloom by May 12th. Notice that the inoculated vetches produced significantly higher levels of nitrogen. Crimson clover was a significant nitrogen producer and is much easier to no-till corn into, so much so that a variety trial for crimson is planned for next year. The subterranean clover had an improved stand approaching 30%, but stand was not uniform and top growth yield was very low and therefore not measured. All the clover trials experienced significant deer feeding, with Persian clover having heavy damage which affected

yields. The 2009 spring season was perfect for clover growth producing exceptional yields. Crimson clover nitrogen levels were low because it was it was 3 weeks past full bloom, and Persian clover was full vegetative explaining why the nitrogen content was high.

September 10 planting study results

	actual DM#/acre	actual total nitrogen/a	n test %
austrian winter pea	3267.0	**58.5**	1.79
Mihi Persian clover	1232.7	**44.3**	3.59
Dixie Crimson Clover	7910.2	**136.1**	1.72
common crimson clover	7788.5	**139.4**	1.79
Vkaup hairy vetch	3087.3	**81.2**	2.63
Vf-1 Forage First hairy vetch	2041.1	**53.7**	2.63
Steve Groff hairy vetch	4116.4	**111.1**	2.7
Pennington Vp-07 hairy vetch inoculated	4631.0	**144.9**	3.13
Pennington Vp-08 hairy vetch inoculated	4888.2	**180.4**	3.69
Pennington Vp-07 hairy vetch	2658.5	**86.9**	3.27
Pennington Vp-08 hairy vetch	3001.6	**117.1**	3.9
albert leah hairy vetch	2767.7	**87.2**	3.15

Usable Nitrogen

Whether nitrogen is usable for the summer crop depends on many factors, with maturity at the time of killing, rainfall, temperature, and tillage influencing how quickly it is released; more mature the slower the release. Typically, in vegetative stage 50-70% is released in the first 45 days, and with tillage, trials have shown 70% released in as little as 10 days.

Actually it is not a soil N chart it is a total nitrogen % that is in the dried cover crop.

How much N is available is really a difficult thing to accurately quantify. Maturity, tillage, rainfall all play a significant role. Realistically, 50-70% should be available in the first 60 days, with most research showing up to 70% available in 10 days with tillage, and no-till is dependent on rainfall to leach the N out. As an example, when you cut hay and it gets a 2” rain on it, the protein level may drop from 20% to 10% or less….. that is the amount of nitrogen that is leaching out of the residue and that happens in a day.