

Central North Dakota Integrated Organic Production Report

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The NDSU Carrington Research Extension Center’s IOP site is located near Robinson, ND. The site was sown to rye at 4 bu/ac PLS and hairy vetch at 30 lbs/ac PLS on September 19, 2008. The fall stands were excellent on both crops with growth and development occurring until a heavy wet snowfall event on November 6 which covered the site with snow until a late spring melt. Due to above normal snowfall and cold temperatures, spring growth was behind normal at this site and the state as a whole. Both crops overwintered well with spring stand counts taken on May 5, 2009. Approximate stand counts were 38 and 2.8 plants per square foot for rye and vetch, respectively. No winter annual or perennial weeds were present and summer annual weeds were not growing at that point in time.

The rye plots were disked on June 5 (approximately 3405 lbs/ac DM) with the no till rye plots rolled on June 15 (approximately 4270 lbs/ac DM). The disked rye was at 50 % heading and the rolled rye was at 35-40 % anthesis. Annual weeds were not a factor (counts taken) as they were only 1-1.5 inches tall in the rye understory. The disked rye terminated well with high residue levels remaining on the soil surface. The rolled rye (2X) stayed down satisfactorily, although based off past experience it was questionable if it were to remain flat. Maverick pinto beans (90,000 PLS/ac) were then sown on June 15 to both rye treatments. Stand establishment was observed on June 25. Dry bean stands were good and growth was equal in both tillage systems. At this point, the rolled rye had not remained flat and was somewhat erect.

Spring vetch growth was slow with annual weeds dominating the stands on all plots by termination time .Vetch plots reached 50% flower on July 1. All stands of vetch (app. 398 lbs/ac DM) were overtaken by annual weeds and it was decided to mow the vetch plots instead of rolling on July 1. The tilled plots were also disked on July 1. Termination was observed on July 10 with the disked plots having a good kill and the no till plots clean of weeds with the vetch showing regrowth. The vetch plots were sown to Viking 0.89-80N (80 day RM) corn on July 20 at a rate of 22,000 plants/ac PLS. Corn stands were observed on August 5. No stand had established in the no till plots. Disked plots had good stand establishment although deer were feeding on the young corn plants resulting in very low plant numbers. Disked plots were clean of weeds, the no till plots have vetch regrowth dominating the plots.

Currently it is felt that no yield data will be gathered from the corn and dry bean yield data is questionable at this time. The disked dry bean plots are flowering heavily with no pod set due to moisture stress and weeds. Cultivation was not necessary early on in the dry beans. As weeds began to grow it was apparent we could not cultivate with our current Danish s-tine cultivator due to the high amount of residue left by the disked rye. A high residue cultivator was needed for inter-row cultivation of the weeds in the dry beans. The rolled dry bean plots have flowered less and are growing slowly due to the rye tillers that have grown and now dominate the stand.

Table 1: Central North Dakota IOP Treatment Summary

System	Strength	Weakness	Possible Modifications
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Rolled Rye and Dry Bean	<ul style="list-style-type: none"> • Good spring growth of rye • Good pre and post plant weed control 	<ul style="list-style-type: none"> • Rolling did not kill rye • Tillers re-grew to compete with Dry Bean 	<ul style="list-style-type: none"> • Greater rye biomass for effective kill
Disced Rye and Dry Bean	<ul style="list-style-type: none"> • Good spring growth of rye • Discing killed rye effectively and left good residue cover • Good seed bed and seed emergence 	<ul style="list-style-type: none"> • Poor post plant weed control 	<ul style="list-style-type: none"> • Need a high residue cultivator for inter-row cultivation
Mowed (Rolled) Vetch and Corn		<ul style="list-style-type: none"> • Poor stand and spring growth of vetch • Did not have enough biomass to roll – forced to mow • Growth of vetch was slow and delayed corn planting beyond a reasonable window • Poor pre and post plant weed control • Mowed vetch re-grew in corn 	<ul style="list-style-type: none"> • Vetch adapted to North Dakota? • Better overwintering for a solid spring stand to be more competitive with weeds • Faster spring growth for earlier termination and subsequent crop planting • In hind sight, would have mowed vetch earlier in spring to control weeds and stimulate vetch re-growth
Disced Vetch and Corn	Discing killed most vetch and weeds (not all)	<ul style="list-style-type: none"> • Poor stand and spring growth of vetch • Growth of vetch was slow and delayed corn planting beyond a reasonable window • Poor pre-plant weed control 	<ul style="list-style-type: none"> • In hind sight – would not have waited as long to terminate vetch and control weeds

Central North Dakota Pictures:



Figure 1: Planting dry beans into rolled rye on June 15.



Figure 2: Good seed bed in disced rye treatment on June 15. Notice rye growth in plot to the right that was later rolled.



Figure 3: Early dry bean growth in disced rye plot (front left) and rolled rye plot (back right) on July 1, 2009. Notice prepared seedbeds for corn in vetch plots. Disced vetch with weeds (front right) and mowed vetch with weeds (back left).



Figure 4: Dry beans struggling under re-growth of rolled rye tillers on August 5, 2009. Some weeds emerging through rye residue.



Figure 5: Dry beans struggling with weeds in disced rye treatment on August 5, 2009. A high residue cultivator was needed for inter-row tillage to control weeds.



Figure 6: Weeds dominated vetch plots on July 1, 2009. There was insufficient vetch biomass to attempt rolling. See Figure 3 for image of prepared seed beds for mowed and disced treatment.



Figure 7: Vetch and weed re-growth in mowed treatment on August 5, 2009. No successful emergence of the corn planted late on July 20.



Figure 8: Late planted corn and large weeds growing in disced vetch plot on August 5, 2009.