Management of Alfalfa in the Seeding Year

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Alfalfa can be established by direct seeding or by using a companion crop. If forage is required in the year of seeding, then direct seeding or a cereal silage companion crop are used. In short season areas (less then 2600 corn heat units), it is generally recommended that only 1 harvest of forage be taken in the seeding year. Work in northern Ontario has shown that in some years, the second growth following a cereal silage harvest is sufficient to justify harvesting it for stored feed. It is unclear whether taking a second cut in the establishment year is damaging to the subsequent alfalfa crop. This study was undertaken to assess forage yield in the seeding year and in the first production year from direct seeded alfalfa and from alfalfa seeded with an oat companion crop, when the seeding year growth was harvested either 1 or 2 times.

Methods: Alfalfa stands were established at the Thunder Bay Research Station in 1998 and 1999. Subsequent forage yields were measured in the year following establishment. Treatments were: establishment method (direct seeding vs oat companion crop) and number of cuts in the establishment year (1 vs 2). Details of the treatments are shown in Table 1.

Table 1. Details of treatments.

Establishment Method	Cuts in Seeding Year	Variety	Seeding Rate
Direct Seed	1	Centurion alfalfa	12 kg/ha
Direct Seed	2	Centurion alfalfa	12 kg/ha
Oat Companion crop	1	Rigodon oat + Centurion alfalfa	85 kg/ha oats 12 kg/ha alfalfa
Oat Companion Crop	2	Rigodon oat + Centurion alfalfa	85 kg/ha oats 12 kg/ha alfalfa

Results: In both establishment years, oat companion crops yielded significantly more than direct seeded alfalfa (Table 2). The response to number of cuts in the seeding year varied. In 1998, direct seeded alfalfa yielded significantly more from 2 cuts than 1 cut, but there was no significant difference between 1 and 2 cuts for the oat companion crop. In 1999, yield was higher from 2 cuts than 1 cut for both the direct seeded alfalfa and for the oat companion crop. Yield distribution in 1998 was weighted heavily in favour of the first cut, while in 1999 the yield was more evenly distributed.

Forage yields in the year following establishment were generally higher when the establishment method was direct seeding as compared to an oat companion crop (Table 3). The advantage in favour of direct seeding was significant in all harvests in 1999. The same trend occurred in the 2000 harvest for first cut and total yield, but the differences were not significant.

In the 1999 harvest, forage yield was not affected by the number of cuts taken in the

previous (seeding) year. In the 2000 harvest, forage yields were significantly greater when only one cut had been taken in the seeding year (Table 3).

Table 2. Forage yields in the establishment year at Thunder Bay.

Year	Sown 1998 - Harvested 1998			Sown 1999 - Harvested 1999		
Factor	**Cut 1**	**Cut 2**	**Total**	**Cut 1**	**Cut 2**	**Total**
A) Estab. Method						
Direct Seed	968	n/a	1160	690	n/a	1285
Oat Companion Crop	1682		1769	2832		3373
Significance[a]	*		*	**		**
B) # of Cuts						
1	n/a	n/a	1405	n/a	n/a	1838
2			1542			2820
Significance			ns			**
Interaction						
Direct - 1 cut	959		959	775		775
Direct - 2 cut	977	384	1361	606	1190	1796
Oat - 1 cut	1805		1850	2901		2901
Oat - 2 cut	1560	173	1688	2762	1082	3844
Significance	ns		*	ns		ns
Mean	1325	278	1464	1761	1136	2329
CV (%)	11.3		14.1	12.2		19.3

a: *, **, ***; significant at the 0.05, 0.01, and 0.001 level of probability, respectively. ns=not significant

Discussion: Our results show that oat companion crops will yield more forage in the seeding year than direct seeded alfalfa. Therefore, if forage yield in the seeding year is very important, a cereal silage companion crop would be recommended. Taking a second cut in the seeding year also increased forage yield in 3 of 4 situations. Under direct seeding, the second harvest in the seeding year is usually pure alfalfa. With an oat companion crop, the second cut often contains oat regrowth along with newly established alfalfa. This is especially true when the oat companion crop is harvested at the late boot or early heading stage. Oats cut at this stage can have very heavy regrowth which can continue to compete with the underseeded alfalfa. Delaying the first cut until the oat heads are fully emerged will reduce the thickness and vigour of the cereal regrowth, providing better conditions for the underseeded alfalfa. Under dry soil conditions, oat regrowth will be minimal and the new seeding of alfalfa may also be slow to establish. Under this scenario, a second harvest in the seeding year will not be economical.

In the first production year following the 1998 seeding, direct seeded alfalfa outperformed alfalfa established under an oat companion crop. This finding has since been supported by other trials at New Liskeard. If forage yield in the seeding year is not critical, direct seeding of alfalfa

should be considered due to increased hay yields in the first production year.

Table 3. Forage yields in the year following establishment year at Thunder Bay.

Year	Sown 1998 - Harvested 1999			Sown 1999 - Harvested 2000		
Factor	**Cut 1**	**Cut 2**	**Total**	**Cut 1**	**Cut 2**	**Total**
A) Estab. Method						
Direct Seed	5744	2457	8201	5218	1642	6860
Oat Companion Crop	4882	2226	7108	4115	1635	5750
Significance	*	*	*	ns	ns	ns
B) # of Cuts						
1	5438	2348	7786	5955	1934	7889
2	5188	2335	7523	3378	1343	4721
Significance[a]	ns	ns	ns	***	**	***
Interaction						
Direct - 1 cut	5776	2479	8256	6580	1889	8469
Direct - 2 cut	5712	2434	8146	3855	1396	5251
Oat - 1 cut	5100	2216	7316	5329	1980	7309
Oat - 2 cut	4663	2236	6899	2901	1290	4191
Significance	ns	ns	ns	ns	ns	ns
Mean	5313	2341	7654	4666	1639	6305
CV (%)	7.4	4.4	5.7	13.0	12.2	11.4

a: *, **, ***; significant at the 0.05, 0.01, and 0.001 level of probability, respectively. ns=not significant

The effect of taking 1 vs 2 cuts in the seeding year varied. No effect on subsequent alfalfa yields occurred in 1999, but in 2000, taking 2 cuts in the seeding year resulted in a significant reduction in subsequent alfalfa yields. This is not unexpected, since winter survival varies from year to year depending on weather conditions. It is apparent that taking a second cut in the seeding year does impose more stress on the alfalfa, leaving it more susceptible to damage during a harsh winter. In this study, the maximum yield obtained from a second cut in the seeding year was about 1200 kg/ha. In the first production year, the yield reduction between 1 and 2 treatments was over 3000 kg/ha. It is quite possible that this yield reduction would continue into the second production year, although we did not measure those yields. Given the relatively low yields to be gained by taking a second cut in the seeding year relative to the potential loss of yield in the following year(s), it seems wise to refrain from taking a 2nd cut in the seeding year unless a serious feed shortage dictates that the crop be harvested a second time. In the event that taking a second cut in the seeding year was necessary, one could delay harvest until after the critical period to ensure maximum root reserves in the new alfalfa plants. This would still be risky in windswept areas were little snow accumulates.

Conclusions:

1. In the seeding year, cereal companion crops usually yield more forage than direct seeded alfalfa.

2. In the first production year, alfalfa established by direct seeding will usually outyield alfalfa established via an oat companion crop.

3. Taking 2 cuts of forage in the seeding year will, in certain years, increase the risk of winter damage and result in lower forage yields in the first production year. Taking the 2nd cut in the seeding year is not recommended for short season areas unless exceptional circumstances dictate otherwise.