

Table 1. Crop yields (Mg/ha, DM) from the Forage rotation that compares injection manure (IM) and broadcast manure (BM) treatments.

Crop	Year	IM	BM	SE	Constrast
		(6 yr)	(6 yr)		IM vs. BM
		Mg ha ⁻¹			p value
Corn Silage, W	2010	17.30	17.29	0.85	0.98
	2011	10.25	10.87	0.66	0.41
	2012	12.75	11.64	0.43	0.09
Corn Silage, Ca	2010	17.09	17.24	0.85	0.84
	2011	12.94	12.43	0.66	0.50
	2012	15.59	14.31	0.49	0.12
Canola [§]	2010	1.14	1.12	0.13	0.97
	2011	1.53	1.68	0.23	0.36
	2012	1.16	1.39	0.08	0.07
Wheat	2010	--	--	--	--
	2011	3.40	3.23	0.23	0.31
	2012	4.62	4.40	0.29	0.51
Alfalfa& Orchardgrass, Yr. 1 [€]	2010	6.81	7.50	0.85	0.35
	2011	7.22	6.78	0.66	0.57
	2012 [¶]	11.77	10.86	0.54	0.23
Alfalfa&Orchardgrass, Yr. 2	2010	7.01	7.14	0.85	0.86
	2011	13.84	13.27	0.66	0.45
	2012	11.01	11.19	0.54	0.80

MANURE MANAGEMENT COMPARISON		Tests of Fixed Effects		
Source of Variation	df	p value		
Year		2010	2011	2012
Crop [‡]	2	<0.001	<0.001	<0.001
Manure Mgt	1	0.899	0.838	0.036
MainMgt*Crop	2	0.964	0.586	0.114

[‡] When crop entry plots received manure treatments they were included in the across crops analyses.

[§] In 2010 and 2012, spring canola was planted, while in 2011, winter canola was planted in the previous fall.

[€] All forage crop entry yields are reported as total yield for the year.

[¶] The first year of forage in 2012 represents 2 cuttings of BMR sorghum sudangrass, due to poor establishment of alfalfa+grass.

Table 2. Sidedress nitrogen rates applied to corn in 2010 and 2012 following different crops and having received either inject or broadcast manure applications. In 2011, additional nitrogen was added at planting making sidedress nitrogen application unnecessary.

Previous Crop Before Corn in 2012 [€]	Manure Application [‡]	2010	2012
		Sidedress Applied (kg N/ha)	
Alfalfa (2.5 yr stand) [^]	Inject	123	0
	Broadcast	154	56
Red Clover	Inject	123	None
	Broadcast	154	None
Hairy Vetch	Inject	123	None
	Broadcast	154	None
Rye	Inject	123	78
Soy	Inject	74	56
	Broadcast	123	78

[€] Rye was the previous crop at the start of the experiment in 2010.

[‡] 14-15 Mg and 19-20 Mg manure was applied in 2010 and 2012 respectively.

[^] A harvest was taken on May 11, 2012 before burn-down.

Table 3. Forage Yields by harvest dates for the FORAGE rotation in 2010-2012. The main management comparison in this rotation is broadcasting (BM) vs. injecting (IM) manure. Cuttings were taken at the same time each month in 2010-2011 but not in 2012, where alfalfa and grass were cut ~ 2 weeks earlier than pure alfalfa to improve forage quality. In 2012, SS grass =sorghum sudangrass.

2010		Dry Matter Yield (Mg/ha)		
Crop Entry	Harvest Date	IM	BM	(SE)
Alf+Grass Yr. 1 (cut #1)	6/29/2010	1.07	1.32	0.61
Alf+Grass Yr. 1 (cut #2)	8/3/2010	3.78	3.69	0.61
Alf+Grass Yr. 1 (cut #3)	9/14/2010	2.55	2.48	0.61
Alf+Grass Yr. 2 (cut #1)	6/29/2010	1.19	1.14	0.31
Alf+Grass Yr. 2 (cut #2)	8/3/2010	3.38	3.31	0.31
Alf+Grass Yr. 2 (cut #3)	9/14/2010	2.43	2.44	0.31
2011		Dry Matter Yield (Mg/ha)		
Crop Entry	Harvest Date	IM	BM	(SE)
Alf+Grass Yr. 1 (cut #1)/silage	6/3/2011	2.23	2.03	0.127
Alf+Grass Yr. 1 (cut #2)/hay	7/1/2011	1.10	1.15	0.127
Alf+Grass Yr. 1 (cut #3)/silage	8/1/2011	0.48	0.57	0.127
Alf+Grass Yr. 1 (cut #4)/silage	8/31/2011	1.96	1.97	0.127
Alf+Grass Yr. 1 (cut #5)/silage	11/3/2011	1.45	1.51	0.127
Alf+Grass Yr. 2 (cut #1)/silage	6/3/2011	5.13	5.52	0.281
Alf+Grass Yr. 2 (cut #2)/hay	7/1/2011	2.48	2.43	0.281
Alf+Grass Yr. 2 (cut #3)/silage	8/1/2011	1.55	1.32	0.281
Alf+Grass Yr. 2 (cut #4)/silage	8/31/2011	3.06	2.39	0.281
Alf+Grass Yr. 2 (cut #5)/silage	11/3/2011	1.63	1.61	0.281
2012		Dry Matter Yield (Mg/ha)		
Crop Entry	Harvest Date	IM	BM	(SE)
SS Grass Yr. 1 (cut #1)/silage	7/24/2012	5.03	4.85	0.507
SS Grass Yr. 1 (cut #2)/silage	8/30/2012	5.85	6.98	0.507
Alf+Grass Yr. 2 (cut #1)/silage	5/11/2012	2.67	2.60	0.086
Alf+Grass Yr. 2 (cut #2)/silage	6/8/2012	2.86	2.74	0.086
Alf+Grass Yr. 2 (cut #3)/hay	7/9/2012	1.99	1.96	0.086
Alf+Grass Yr. 2 (cut #4)/silage	8/3/2012	1.35	1.37	0.086
Alf+Grass Yr. 2 (cut #5)/hay	9/6/2012	2.32	2.34	0.086