

Progress Report for Optimum Planting Date For Alfalfa Grown In the Columbia Basin

William T. W. Woodward and John Kugler
Extension Agronomists, WSU

December 7, 2004

Purpose of Research:

To determine optimum seeding dates for late summer seeded alfalfa in the Columbia basin hay growing area.

Needs addressed by research:

The production potential and profitability of an alfalfa field can be strongly influenced by planting dates. Seedling development, stand density and forage yield can be negatively affected. The risk of late-summer planting occurs when fields are planted too late for proper plant development. Planting should be completed at least 30 to 45 days prior to the first killing frost. Harsh winter conditions can weaken immature seedlings and result in a poorly established lower yielding field. Large plants with a developing crown are able to withstand harsher conditions. Both photoperiod and temperature affect the growth and development of seedling alfalfa. Photoperiod may have a larger effect than temperature for dormant alfalfa in the Columbia basin because of its northern location. Insufficient information on optimum planting dates for alfalfa development is available for the Columbia basin. There is no information on the best dates for planting for optimizing the yield for the following year.

Answers expected as a result from research:

A planting date study will provide the information necessary to optimize yields the following year. It will determine if yields are affected by dates and to what degree. It would also provide risk for failure for late plantings.

Timeline of project:

Three years

Benefit to hay growers:

When to plant is a decision growers must make every time a new stand is to be established. Date of late-summer planting can determine yields the following as well as the life of the stand. The ultimate benefit to the hay grower is higher yields and successful stand establishment.

Budget:

- Conditions:
1. Planted near current alfalfa yield trials
 2. Planted in late summer and harvested for two years
 3. Eight planting dates at two locations
 4. Four replications with one variety
 5. Total of 32 plots at each location
 6. Using same equipment used for yield trials

Cost: \$22.50 per plot = \$1440 per year

Total: \$2880

First Year Results for 2002 Seedings:

•Pasco

- Yield declines across planting dates was the trend.
- Significant differences occurred between August and September planting dates.
- Significant yield declines over planting dates occurred in all but the last cut.

•Othello

- Significant differences occurred only in the first cut and total yield.
- No significant differences were observed for total yield among the first five planting dates.

Second Year Results for 2002 Seedings:

•Pasco

- The trend for yield declines across planting dates continued with significant differences occurring only on the first cut. There were no significant differences in total yield for the 2004-year.
- Significant differences were found for the two-year total due to the large yield differences that occurred in the first harvest year.
- Second year harvest yields were not significantly effected by planting dates.

•Othello

- There were no significant differences found among harvests or for total yield in the second year.
- Significant differences did occur among planting dates for total yield over two years and was attributed to large differences that occurred in the first harvest year.

First Year Results for 2003 Seedings:

•Pasco

- Significant differences were found for planting dates over the first four harvests. No significant differences were shown for the fifth harvest.
- Total yield ranged from 8.5 tons for the earliest planting date to 5.7 tons for the latest planting date. Significant differences occurred among planting dates for total yield.
- Yield declines in the first year were similar to the 2002 seeding.

•Othello

- Significant differences were found for planting dates over all four harvests with obvious differences in the first cut.
- Total yield ranged from 10 tons for the earliest planting date to 5.3 tons for the latest. Significant differences occurred among planting dates for total yield.
- Yield declines due to later planting dates were not similar to what was found in the 2002 seeding due to the delayed harvest of the last three planting dates in the 2003 harvests of the 2002 seeding.

Pasco Date of Seeding Study (2002 seeding)
Forage Yield (Tons DM/Ac)

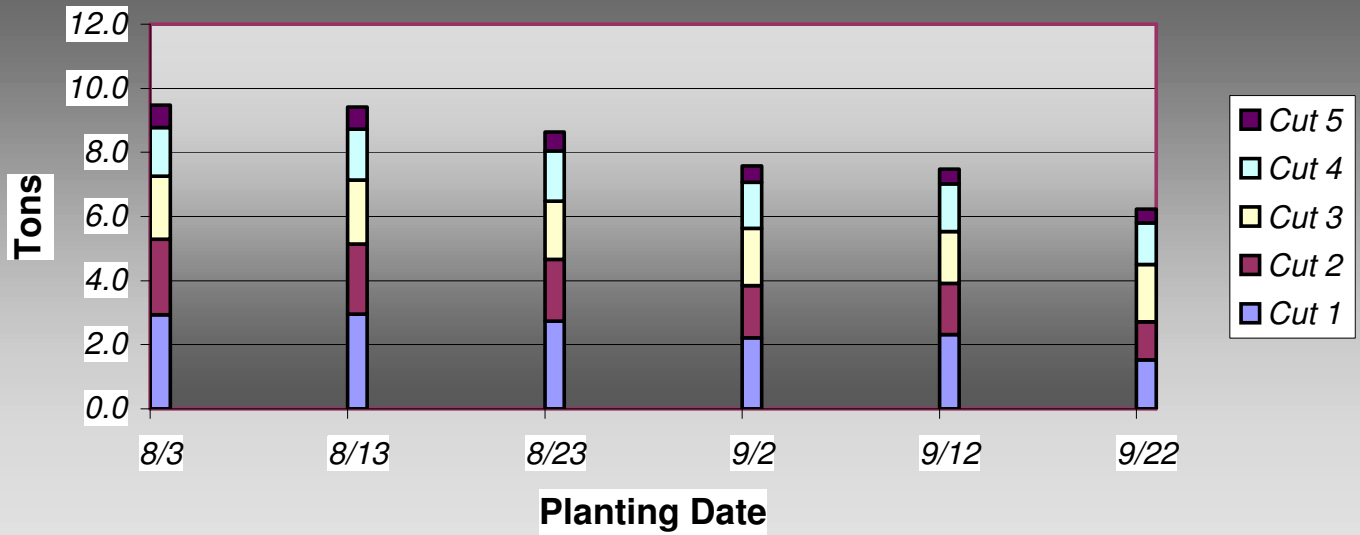
Entry	Final %Stand	2003 Harvests						2003 Total	Percent mean	2004 Harvests					2004 Total	Percent mean	2005 Total	Yield		Yield		3-Jun Regrowth
		15- May Cut 1	16-Jun Cut 2	24-Jul Cut 3	20- Aug Cut 4	24- Sep Cut 5	6- May Cut 1			11- Jun Cut 2	14- Jul Cut 3	16- Aug Cut 4	12- Oct Cut 5	2- Year Total				2-Yr % mean	3- Year Total	3-Yr % mean		
08/03/02	1.0	2.9	2.4	2.0	1.5	0.7	9.5	116.3%	2.2	1.5	1.6	1.6	0.8	7.7	106.6%	0.0	17.2	111.8%	17.2	111.8%	8.5	
08/13/02	2.0	2.9	2.2	2.0	1.6	0.7	9.4	115.8%	2.1	1.7	1.5	1.7	0.9	7.9	109.8%	0.0	17.3	113.0%	17.3	113.0%	7.8	
08/23/02	3.0	2.7	1.9	1.8	1.6	0.6	8.6	106.2%	1.9	1.5	1.6	1.6	0.8	7.4	102.7%	0.0	16.1	104.6%	16.1	104.6%	6.8	
09/02/02	4.0	2.2	1.6	1.8	1.4	0.5	7.6	93.1%	2.1	1.3	1.3	1.4	0.7	6.8	94.1%	0.0	14.4	93.6%	14.4	93.6%	5.5	
09/12/02	5.0	2.3	1.6	1.6	1.5	0.5	7.5	91.9%	2.0	1.2	1.4	1.5	0.6	6.7	92.3%	0.0	14.1	92.1%	14.1	92.1%	4.8	
09/22/02	6.0	1.5	1.2	1.8	1.3	0.4	6.2	76.6%	2.0	1.2	1.3	1.5	0.7	6.8	94.4%	0.0	13.0	85.0%	13.0	85.0%	3.5	
Mean	3.5	2.5	1.8	1.8	1.5	0.6	8.1	100.0%	2.0	1.4	1.4	1.5	0.8	7.2	100.0%	0.0	15.4	100.0%	15.4	100.0%	6.1	
LSD 5%	0.00	0.42	0.23	0.24	0.18	NS	0.79	9.68%	NS	0.30	NS	NS	0.23	NS	NS	0.00	1.59	10.34%	1.59	10.34%	1.06	
CV %	0.0	12.0	9.0	9.1	8.7	26.2	6.7	6.7	10.0	14.8	11.9	16.1	20.7	9.9	9.9	#DIV/0!	7.2	7.2	7.2	7.2	12.0	

* No visual differences in regrowth on 5/20/04

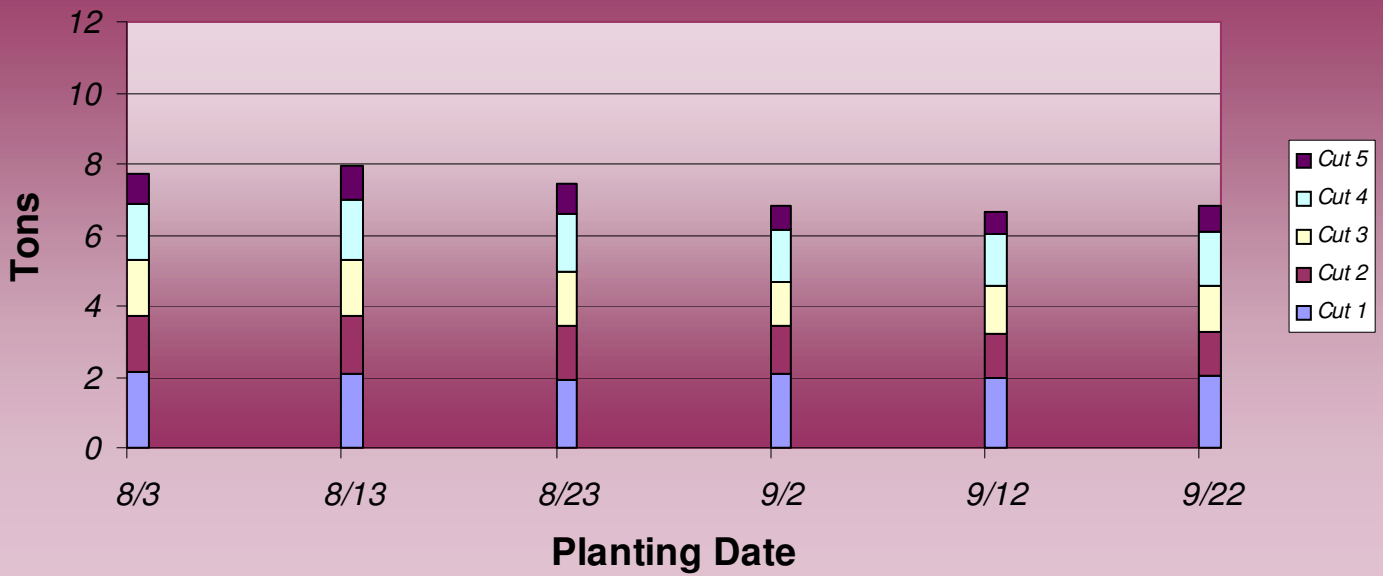
Othello Date of Seeding Study (2002 seeding)
Forage Yield (Tons DM/Ac)

Year 2003 Entry	Final %Stand	2003 Harvests					2003 Total	Percent mean	2004 Harvests				2004 Total	Percent mean	2005 Total	Yield		Yield	
		20- May Cut 1	24- Jun Cut 2	29- Jul Cut 3	5-Sep Cut 4	13- May Cut 1			17- Jun Cut 2	19-Jul Cut 3	27- Aug Cut 4	2- Year Total				2-Yr % mean	3- Year Total	3-Yr % mean	
08/03/02	1.0	3.2	2.7	2.5	2.1	10.6	111.3%	2.9	1.6	1.8	2.2	8.5	103.0%	5.0	19.0	107.5%	24.0	68.3%	
08/13/02	2.0	2.9	2.4	2.6	2.4	10.3	108.9%	2.9	1.7	1.9	2.3	8.8	107.6%	10.0	19.2	108.3%	29.2	82.9%	
08/23/02	3.0	2.2	2.2	2.4	2.2	8.9	94.2%	2.4	1.4	1.5	2.0	7.3	89.2%	15.0	16.3	91.9%	31.3	88.8%	
09/02/02	4.0	2.9	2.5	2.5	2.2	10.1	105.9%	2.8	1.6	1.8	2.3	8.6	104.0%	20.0	18.6	105.0%	38.6	109.6%	
09/12/02	5.0	2.2	2.6	2.5	1.7	9.0	94.5%	2.7	1.5	1.7	2.0	8.0	97.2%	25.0	17.0	95.7%	42.0	119.2%	
09/22/02	6.0	1.8	2.3	2.3	1.7	8.1	85.3%	2.7	1.5	1.8	2.2	8.1	98.9%	30.0	16.2	91.6%	46.2	131.3%	
Mean	3.5	2.5	2.4	2.5	2.0	9.5	100.0%	2.7	1.6	1.7	2.2	8.2	100.0%	17.5	17.7	100.0%	35.2	100.0%	
LSD 5%	0.00	0.59	NS	NS	NS	1.20	12.60%	NS	NS	NS	NS	NS	NS	0.00	1.83	10.34%	1.83	5.20%	
CV %	0.0	16.1	9.6	8.5	20.3	8.8	8.8	11.6	11.2	12.1	10.0	9.0	9.0	0.0	7.2	7.2	3.6	3.6	

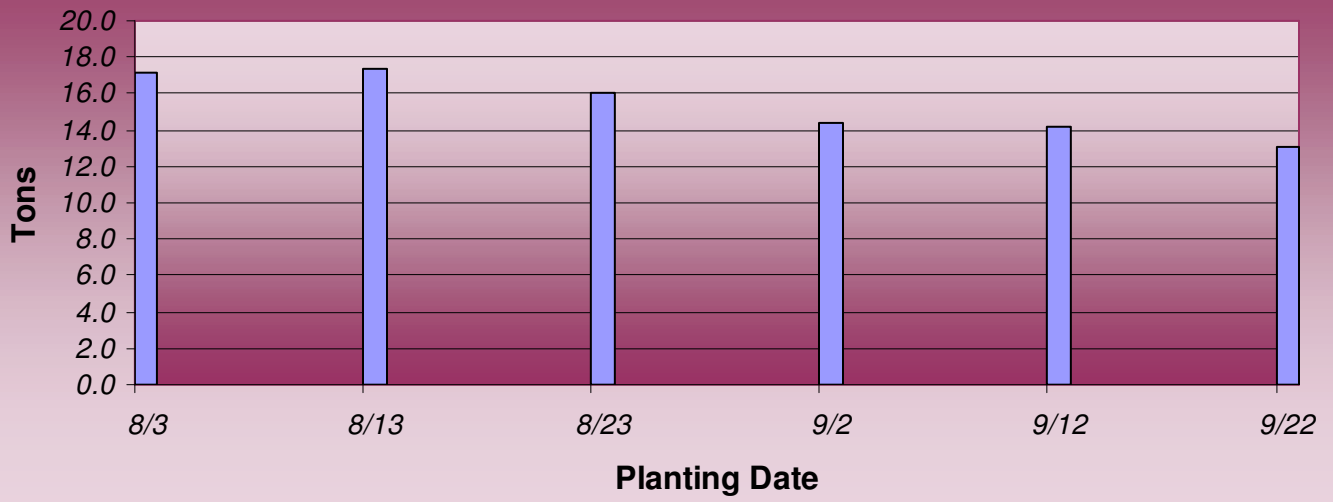
Pasco 2002 Seeding 2003 Yields



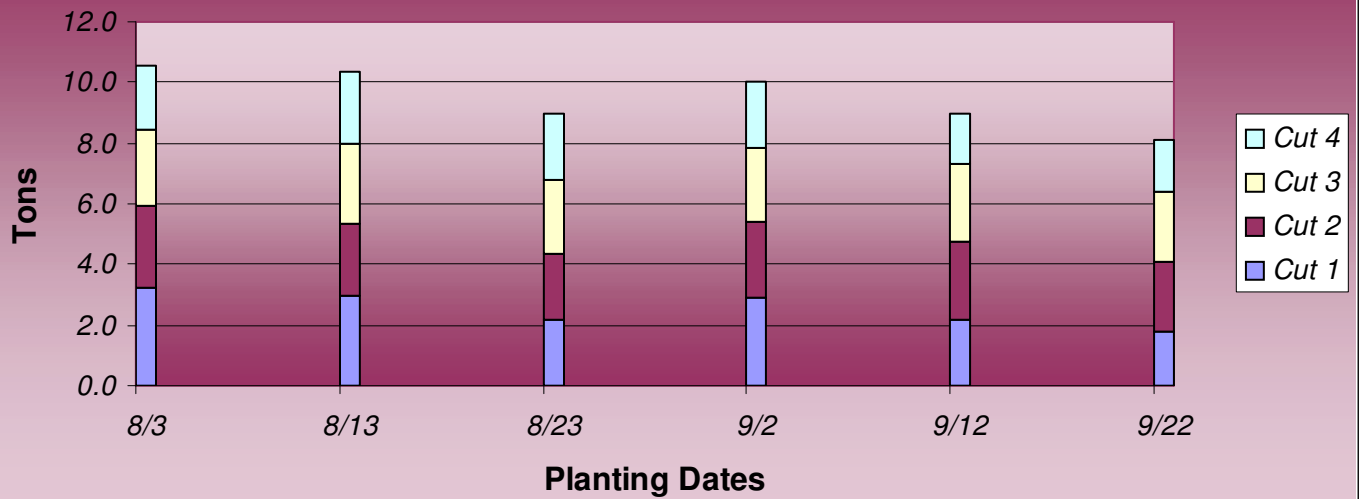
Pasco 2002 Seeding 2004 Yields



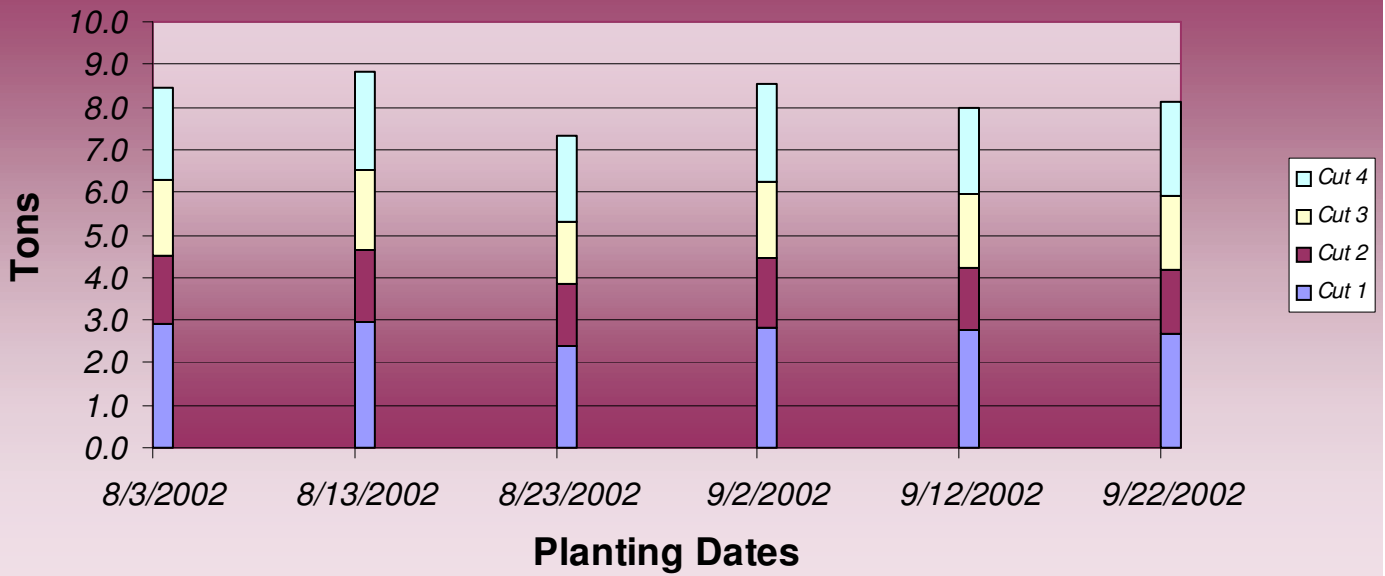
Pasco 2002 Seeding Two Year Total



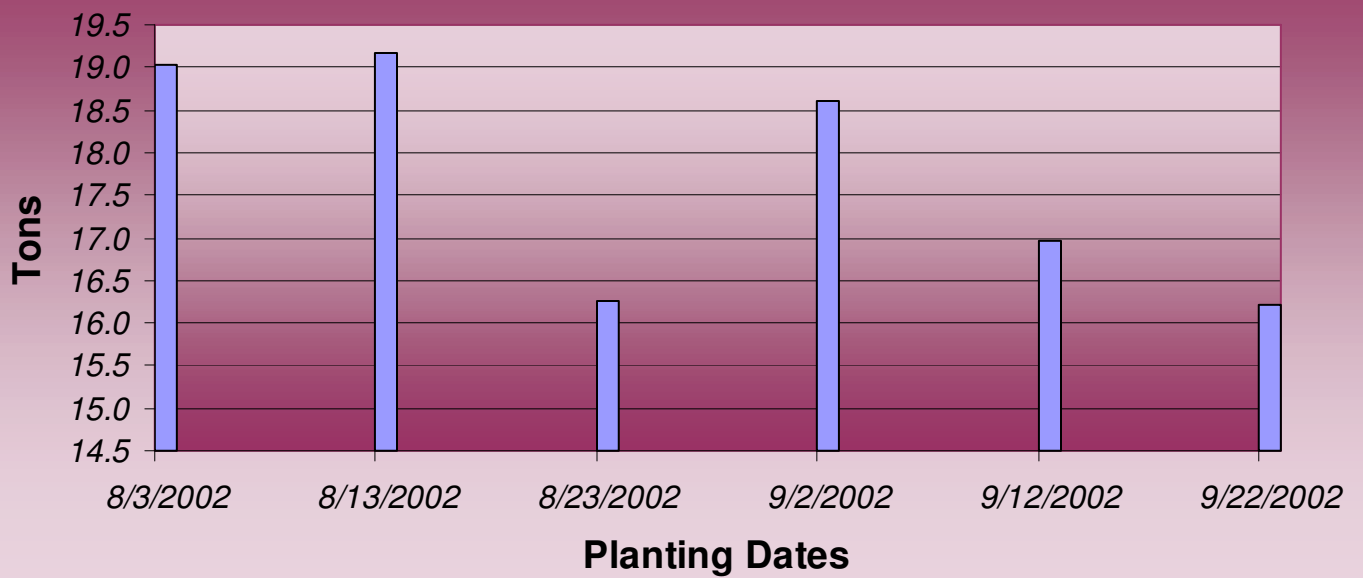
Othello 2002 Seeding 2003 Yields



Othello 2002 Seeding 2004 Yields



Othello 2002 Seeding 2 Yr Total



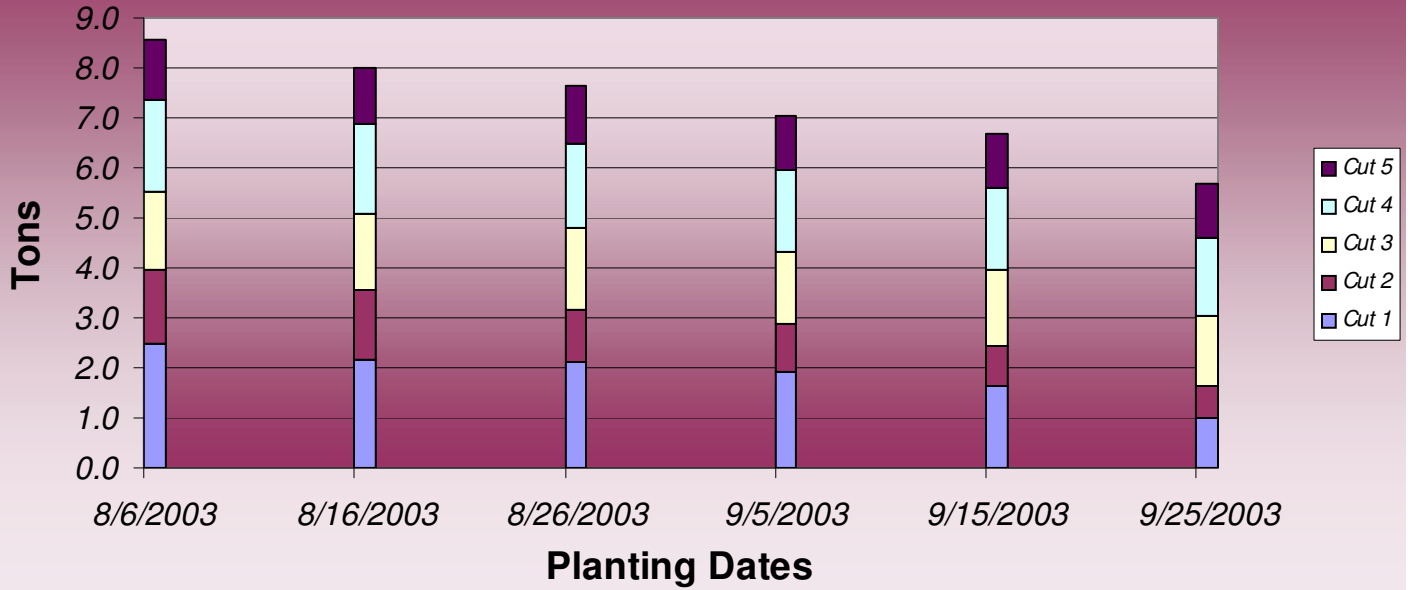
Pasco Date of Seeding Study (2003 seeding)
Forage Yield (Tons DM/Ac)

Entry	Final %Stand	2004 Harvests					2004 Total	Percent mean	2005 Total	Yield		
		7- May Cut 1	11- Jun Cut 2	14- Jul Cut 3	16- Aug Cut 4	12- Oct Cut 5				2- Year Total	2-Yr % mean	20-May Regrowth
08/06/03	1.0	2.5	1.5	1.5	1.8	1.2	8.5	117.8%	0.0	8.5	117.8%	9.0
08/16/03	2.0	2.2	1.4	1.5	1.8	1.1	8.0	110.1%	0.0	8.0	110.1%	7.8
08/26/03	3.0	2.1	1.1	1.6	1.7	1.1	7.6	105.1%	0.0	7.6	105.1%	6.8
09/05/03	4.0	1.9	0.9	1.4	1.6	1.1	7.0	96.9%	0.0	7.0	96.9%	5.3
09/15/03	5.0	1.6	0.8	1.5	1.6	1.1	6.7	91.9%	0.0	6.7	91.9%	4.3
09/25/03	6.0	1.0	0.6	1.4	1.5	1.1	5.7	78.2%	0.0	5.7	78.2%	3.0
Mean	3.5	1.9	1.1	1.5	1.7	1.1	7.3	100.0%	0.0	7.3	100.0%	6.0
LSD 5%	0.00	0.25	0.29	0.13	0.17	NS	0.65	8.9%	0.00	0.65	8.94%	0.88
CV %	0.0	9.1	19.2	6.1	7.0	9.4	6.2	6.2	#DIV/0!	6.2	6.2	10.2

Othello Date of Seeding Study (2003 seeding)
Forage Yield (Tons DM/Ac) (2003 seeding)

Entry	Final %Stand	2004 Harvests					Date Cut 5	2004 Total	Percent mean	2005 Total	Yield	
		13- May Cut 1	17- Jun Cut 2	19- Jul Cut 3	27- Aug Cut 4	2- Year Total					2-Yr % mean	
08/06/03	1.0	3.0	2.1	2.3	2.6	0.0	10.0	131.7%	0.0	10.0	131.7%	
08/16/03	2.0	2.6	2.0	2.2	2.4	0.0	9.2	121.3%	0.0	9.2	121.3%	
08/26/03	3.0	2.0	1.8	2.2	2.6	0.0	8.6	113.3%	0.0	8.6	113.3%	
09/05/03	4.0	1.1	1.2	1.7	2.0	0.0	6.0	78.8%	0.0	6.0	78.8%	
09/15/03	5.0	0.2	1.6	2.1	2.6	0.0	6.5	85.6%	0.0	6.5	85.6%	
09/25/03	6.0	0.1	1.2	1.6	2.4	0.0	5.3	69.3%	0.0	5.3	69.3%	
Mean	3.5	1.5	1.6	2.0	2.4	0.0	7.6	100.0%	7.6	7.6	100.0%	
LSD 5%	0.00	0.41	0.40	0.37	0.17	0.00	0.69	9.0%	0.00	0.69	9.05%	
CV %	0.0	18.9	16.9	12.7	5.0	#DIV/0!	6.3	6.3	#DIV/0!	6.3	6.3	

Pasco 2003 Seeding 2004 Yields



Othello 2003 Seeding 2004 Yields

