Seeding Date Impact on Production of Three Cool-Season Forage Species

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Introduction:

In the Northern Great Plains, spring seeding is often used for perennial forage establishment. By delaying seeding later into the season, producers may be able to strategize their work load, provided establishment rates are not compromised. The objective of this study was to evaluate the impact of a later seeding date on forage establishment and yield. We hypothesized that a later planting date, with sufficient irrigation, would show no differences in yield or plant count compared to a traditional spring planting.

Materials and Methods:

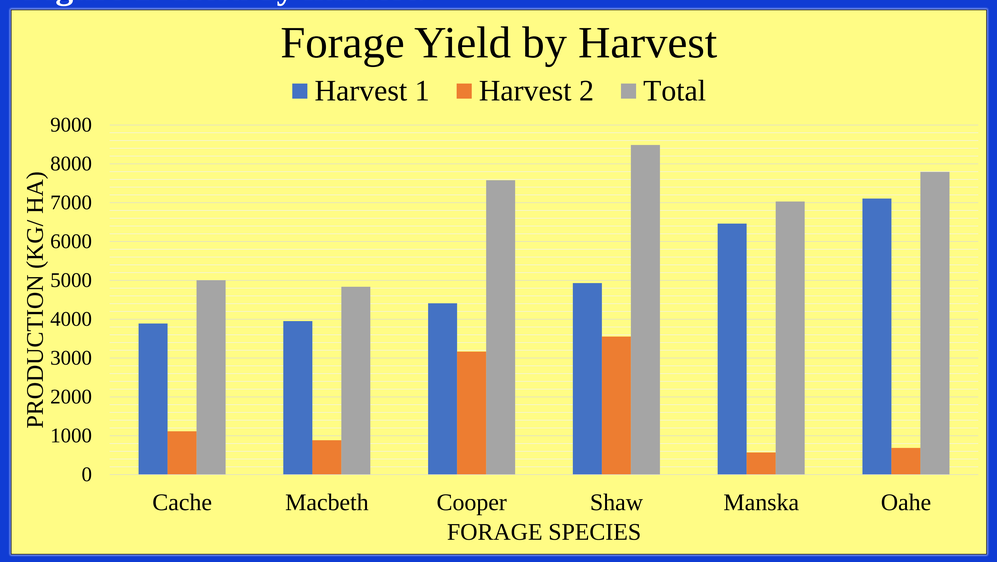
- Experiment site was located at the NRCS Plant Materials Center in Bridger, MT on Heldt silty clay loam, with average precipitation of 292 mm[1].
- A replicated randomized complete block design was used, consisting of the six cultivars and four replications.
  - 'Shaw' and 'Cooper' alfalfa (*Medicago sativa* L.)
  - 'Oahe' and 'Cache' wheatgrass (*Thinopyrum intermedium*)
  - 'Macbeth' and 'Manska' bromegrass (*Bromus biebersteinii*)
- Spring-planted plots were established on June 12, 2015. Summer plots were established on July 27, 2015. Plots were 1.8 m x 6 m, with flood irrigation.
- An extra herbicide application was applied to Summer plots in July, 2015 immediately prior to planting.
- Plant and weed counts was taken from two randomly selected .3 m x .3 m quadrats within each plot on April 26, 2016 and June 9, 2016.
- Herbage mass production was calculated from a single .9 m x 6 m strip taken from the middle of each plot on June 20, 2016 and August 15, 2016. Plant maturities were also recorded at these times.
- Fresh and dry weights were collected to determine dry matter production.

Table 1. Plant and weed counts for varieties.

		Plant Count plants/ sq m		Weed Count plants/ sq m	
Variety	**Species**	**Spring[a]**	**Summer[b]**	**Spring**	**Summer**
Shaw	**alfalfa**	43.1	40.9	0	4.09
Cooper	**alfalfa**	34.4	45.2	2.69	6.78
Oahe	**wheatgrass**	36.6	44.1	1.4	0
Cache	**wheatgrass**	35.5	38.8	1.4	0
Macbeth	**bromegrass**	34.4	39.8	0	0
Macbeth + biologic	**bromegrass**	35.5	34.4	0	0
Manska	**bromegrass**	24.8	39.8	0	2.69

Trend for effect of variety (P=0.0518) and rep (P=0.0761) on weed count

Figure 1. Yield by harvest.



Discussion:

- There was a significant impact of seeding date (P=0.0389) on plant count, with summer planting higher than spring planting
  - No effect of variety, rep or their interaction on plant count (P > 0.05)
- There was a trend for an effect of variety (P=0.0518) and rep (P=0.0761) on weed count
  - No effect of treatment or their interactions on weed count
- Significant impact of variety, harvest (1 > 2), and variety x harvest (all P <0.0001) on yield
  - Some varieties showed considerable yield increases over others, in agreement with previous studies[2]
  - Rehm et al.[3] found decreases in yield when summer-planted, opposite of our findings, however the study was in MN

Conclusion:

Under irrigation or a non-limited water situation, a delayed planting may be as successful as early spring planting. Enough time must be provided between planting and the first killing frost for adequate growth. More data would be needed before recommending for a dryland or limited moisture situation.

Acknowledgements:

We would like to thank Dr. Joe Scianna, Darren Zentner, Ross Oyler, and Robert Kilian at the USDA NRCS Bridger Plant Materials Center for all of their help and collaboration on the project. The authors would also like to help Larry Holzworth and Dave Wichman for their help in ensuring the success of this project as well.

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