# Influence of Different Seeding Dates on Fenugreek *(Trigonella foenum-graecum L.)* Forage Yield and Nutritive Value

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## INTRODUCTION

Fenugreek is an annual legume crop native to Asia and southeast Europe that historically has been used for medicinal as well as culinary herb purposes. Studies in Canada documented the potential of fenugreek as a forage crop for livestock in the northern Great Plains. Apart from its high quality forage, like other legumes, fenugreek can fix nitrogen (N) and help maintain soil health and quality.

Fenugreek provides an option for producers who want to take advantage of N fixation from forage legumes to reduce N fertilizer inputs. An alternative forage crop such as fenugreek has the potential to diversify forage and crop production systems in Kansas.

## OBJECTIVES

The goal of this study was :

- To develop agronomic production recommendations for potential adaptation of fenugreek to western Kansas growing conditions.
- A specific objective was to determine the influence of planting date on forage production and quality of fenugreek cultivars under dryland conditions.

## MATERIALS AND METHOD

➢Location: Kansas State University Agricultural Research Center, Garden City and Hays, KS.

➢Experimental Design: Randomized complete blocks with a split-plot arrangement.

➢Main plot – Three (3) Planting dates;
- April 1, 2014
- April 22, 2014
- May 12, 2014

➢ Sub plot – Three (3) Fenugreek cultivars;
- Amber
- Tristar
- F96

➢ Data collection

Fenugreek was harvested at milk stage to determine DM yield and nutritive value. Forage samples were dried, ground, and passed through a 1 mm mesh screen and analyzed for:
- crude protein (CP)
- acid detergent fiber (ADF)
- neutral detergent fiber (NDF)
- total digestible nutrients (TDN)
- relative feed value (RFV)

➢ No data was collected on the plots in Garden City due to severe drought in spring of 2014.

## RESULTS AND DISCUSSION

***Forage Nutritive Value***

- Planting date had a significant ($P < 0.05$) effect on fenugreek CP, ADF, NDF, and TDN concentrations as well as RFV (Table 1).
- Delaying planting until May 12 decreased CP concentration and increased ADF and NDF concentrations (Table 1).
- Planting fenugreek early increased CP levels and decreased fiber content, as indicated by the relatively lower ADF and NDF concentrations (Table 1).
- Early planting resulted in greater P and K concentration in the forage. Ca and Mg concentrations did not differ among the three planting dates (Table 1).
- Ca and K concentrations differed among the cultivars. Average Ca concentration ranged from 16.1% (‘Amber’ and ‘Tristar’) to 15.1% (‘F96’). Similarly, K concentrations were 3.2% for ‘F96’ , 3.0% for ‘Tristar’, and 3.0% for ‘Amber’ (Table 2).

Fenugreek at pod filling.

Table 1. Fenugreek forage dry matter productivity and nutritive value as affected by time of planting.

| Planting Date | Dry matter yield (lb/a) | CP (%) | ADF (%) | NDF (%) | TDN (%) |
|---|---|---|---|---|---|
| April 1 | 842a[1] | 20.9a | 28.3b | 32.7b | 71.3a |
| April 22 | 698a | 21.5a | 26.0b | 29.8b | 73.8a |
| May 12 | 801a | 15.8b | 33.0a | 39.9a | 66.1b |
| SE[2] | 136 | 1.3 | 1.4 | 1.5 | 1.5 |
| | | | | | |
| | **Ca (%)** | **P (%)** | **K (%)** | **Mg (%)** | **RFV** |
| April 1 | 1.6a | 0.27a | 3.1a | 0.27a | 192a |
| April 22 | 1.6a | 0.27a | 3.2a | 0.30a | 216a |
| May 12 | 1.5a | 0.21b | 2.8b | 0.26a | 148b |
| SE[2] | 0.07 | 0.01 | 0.14 | 0.02 | 0.5 |

[1]Means followed by same letter(s) in a column are not significantly different at $P \geq 0.05$
[2]Standard error for mean comparison

## RESULTS AND DISCUSSION

Table 2. Fenugreek cultivar effects on forage dry matter productivity and nutritive value.

| Cultivar | Dry matter yield (lb/a) | CP (%) | ADF (%) | NDF (%) | TDN (%) |
|---|---|---|---|---|---|
| Amber | 759ab[1] | 19.2a | 29.3a | 34.5a | 70.2a |
| F96 | 910a | 19.2a | 29.1a | 34.3a | 70.3a |
| Tristar | 672b | 19.9a | 28.8a | 33.7a | 70.7a |
| SE[2] | 94 | 0.7 | 0.8 | 0.7 | 0.8 |
| | | | | | |
| | **Ca (%)** | **P (%)** | **K (%)** | **Mg (%)** | **RVF** |
| Amber | 16.1a | 0.25a | 3.0b | 0.28a | 181a |
| F96 | 15.1b | 0.25a | 3.2a | 0.27a | 185a |
| Tristar | 16.1a | 0.24a | 3.0b | 0.27a | 189a |
| SE[2] | 0.04 | 0.01 | 0.09 | 0.01 | 1.2 |

[1]Means followed by same letter(s) in a column are not significantly different at $P \geq 0.05$
[2]Standard error for mean comparison

***Forage Dry Matter Yield***

- Fenugreek cultivars differed significantly ($P = 0.05$) in forage DM yield. Average forage production of the advanced line ‘F96’ was greater or comparable to the commercial fenugreek cultivars ‘Amber’ and ‘Tristar’ (Table 2).
- Forage DM yields observed in this study are lower than yields reported elsewhere. Drought conditions in the spring of 2014 might have been responsible for the lower yields observed in this study.

## CONCLUSION

- Forage nutritive value of fenugreek cultivars under rainfed conditions in western Kansas is comparable or greater than alfalfa, but DM yield was lower than average yields of 4000 lb/a reported for dryland alfalfa in the region.
- Our preliminary results demonstrate the potential of fenugreek to diversify forage production in the central Great Plains.

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