# Effect of cutting dates on vegetative yield and its componenets of Fenugreek (Trigonella foenum-graecum L.)

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#### ABSTRACT

Fenugreek (*Trigonella foenum-graecum* L.), plant is widely distributed throughout the world and which belongs to the family Fabacecae. This investigation was conducted in the winter season of 2013 in the fields of Faculty of Agricultural Sciences University of Sulaimani. The experiment was carried out using Randomized Complete Block Design (RCBD) with three replications to study the effect of cutting dates on the characters: plant height, fresh and dry weight of leaf, fresh and dry weight of stem, dry matter, fresh and dry forage yield for local fenugreek. Means comparison were carried out using least significant difference test (LSD) at 0.05 significant levels. Results of the present study indicated a significant effect of cutting dates for all characters with the exception of fresh forage yield character which was found to be not significant; and the second cut out yielded the first cut in plant height, fresh and dry leaf, fresh and dry stem, dry matter, and dry forage yield. **Keywords:** Fenugreek, Fabaceae, vegetative yield, cutting date.

# تاثير مواعيد القطع على حاصل العلف و مكوناته لمحصول الحلبة (Trigonella foeunm - gracum L.) تتثير مواعيد القطع على حاصل العلف و مكوناته لمحصول الديمية

الخلاصة

نبات الحلبة (... Arrow gracum L.) واسع انتشار عالميا ، و هو يعيد العائلة البقولية. طبق هذا البحث للموسم الشتوى 2013 في الحقول كلية العلوم الزراعية – جامعة السليمانية باستخدام تصميم القطع العشوائية الكاملة ((RCBD) بثلاثة المكررات لدراسة تاثير مواعيد القطع على صفات : ارتفاع النبات ، وزن الاوراق الطرى و الجاف، وزن الساق الطرى والجاف العرى والجاف العرى والجاف المرى والجاف المرى والجاف العرى والجاف المرى والجاف المرى والجاف المرى والجاف المرى والجاف الموسم الشتوى 2013 في الحرى و الماق الطرى الماق الطرى والجاف وزن الساق الطرى والجاف المادة المكررات لدراسة تاثير مواعيد القطع على صفات : ارتفاع النبات ، وزن الاوراق الطرى و الجاف، وزن الساق الطرى والجاف المادة المادة المادة المادة الجافة ، و حاصل النمو الخضري الطرى والجاف لمحصول الحلبة المحلية . تحت المقارنة بين متوسطات الصفات باستخدام اختبار القل فرق معنوية (L.S.D) بمستوى 20.5 . بينت النتائج وجود تاثيرات معنوية لمواعيد القطع لكل الصفات المدروسة ما عدا صفة حاصل النمو الخضري الطرى والتى كانت غير المعنوية . وجود تاثيرات معنوية لمواعيد القطع لكل الصفات المدروسة ما عدا معنوية المادة الحلوي المواعيد القطع العلم الصفات المدروسة ما عدا من من والحاف لمحصول الحلية المحلية . وحمل الذر علي موعيد القطع لكل الصفات المدروسة ما عدا صف حاصل النمو الخضري الطرى و التى كانت غير المعنوية . وقد تفوق موعد القطع الثانى على موعد القطع الأول لصفات ارتفاع النبات ، وزن الاوراق الطرى و التى كانت غير المعنوية . وقد تفوق مو دالطع الثانى على مو عد القطع الأول لصفات ارتفاع النبات ، وزن الاوراق الطرى و الجاف ،وزن الساق الطرى والجاف والجاف والحوى والجاف المرى والجاف يو مواجاف .

الكلمات المفتاحية: الحلبة ، العئلة البقولية ،حاصل النمو الخضري ، موعد القطع

#### **INTRODUCTION:**

Fenugreek (*Trigonella foenum-graecum* L.) is a valuable speciality crop of the Fabaceae family which is used both as a herb and as a spice. It has potential to be used as animal feed (1). Fenugreek is an annual, self-pollinating, legume crop, believed to be native to the Mediterranean region but now, is widely cultivated in India and other parts of the World [2]. Although grown as a spice in most parts of the world, the species name "*foenum-graecum*" means "Greek hay" indicating its

use as a forage crop in the past. Fenugreek also is known as one of the oldest medicinal plants recognized in recorded history (3). It is commonly used as a condiment and seasoning in food preparations; is assumed to possess nutritive and restorative properties and has been used in folk medicine for centuries for a wide range of diseases including diabetes (4). The leaves are used as green leafy vegetables in diets. Fenugreek seeds are bitter to taste and have been known over 2500 years for their medicinal qualities (5).

Fenugreek is also a good soil renovator and has widely been used as a green manure in agricultural production (6). Fenugreek can be a very useful legume crop for incorporation into the short-term rotation and for hay and silage for livestock feed, for fixation of nitrogen in the soil and its fertility (7). Fenugreek is an erect, typically growing to a height of 0.3-0.6 m (1-2<sup>1</sup>/<sub>2</sub> ft). The plant has a sharp, spicy aroma. It has a smooth hollow stem with alternate, single trifoliate leaves are borne on a short petiole with two small stipules at the base. Leaflets are oval and slightly toothed. Flowers are yellow-white (white-flowered types) or sometimes purpletinged (normal types) and develop in the leaf axils either singly or in pairs. Pods are brown, slender, and sickle-shaped with a sharp beak at the end. They are approximately 7-15 cm long, each containing about 10-20 seeds. Fenugreek seed contains little starch or sugar, but a large proportion of dietary fiber (8). The larger white flowered variety will not regrow after flowering so needs successional sowing whereas the yellow variety can be cut a number of times and should be cut regularly to prevent it seeding and keep it productive. They will generally be ready for 6 weeks after sowing depending on the weather. The quality of leaves will decline once flower buds start to appear so try and harvest before then (9). Fenugreek is a leguminous crop which contains nitrogen fixing bacteria in nodules on the roots able to fix atmospheric nitrogen in the soil which helps in improving soil fertility. Its leaves, tender stems and pods are used as vegetable. Seeds are used in condiments and also have medicinal value (10). Its high quality and dryland adaptation makes it attractive as a forage crop for our large beef cattle industry. This crop is expected to reduce feed requirements through increased feed efficiency and lower water consumption during crop production (11). The aim of the present study is to assess the response of fenugreek to different cutting dates for growth and forage yield characters under rainfed condition.

### MATERIALS AND METHODS:

The study was carried out in the field of College of Agricultural Sciences/University of Sulaimani during the winter season of 2013. The experiment was laid out according to randomized complete block design with three replicates, each replication contained three plots with area 4  $m^2$  for cutting treatments (1) cut and 2 cut) each with 5 lines, the line was 2m long with 0.25 m space between the lines. The land of the experiment was prepared by ploughing the field twice and harrowed and then blocked out according to (RCBD). The seed was sown at rate 25Kg/ha on January. All the standard agronomic cultural practices including weed control uniformly adopted for the experiment. The first cut was done, when plant height was 35-40 cm, and the second cut was done after ten days of the first cut when plant height was 45-50cm. Cutting height is usually conducted at 6-8cm above ground level (12).

The studied characters were studied from five randomely plants for plant height, dry weight of leaf percent, dry weight of stem percent, dry matter percent, fresh forage yield, dry forage yield, dry leaf yield and dry stem yield. Plant height was measured from the ground level to the apex of main stem. Fresh forage and dry forage yield (t/ha) and dry matter percent at harvest stage was computed. The sample placed in the oven at 70 C° for 72 hours to determine dry materials.

2

The data were statistically analysed according to one-way ANOVA and comparison among the means was achieved using least significant test (L.S.D) at level of 5% [13].

#### **RESULTS AND DISCUSSION**

The result of growth and yield traits was indicated the significant differences

between the treatments except fresh forage yield trait (Tables 1 and 2).

S.O.V.	d.f	Plant weight of height (cm)	Dry weight of leaf (%)	Dry weight of stem (%)	Dry matter (%)
Block	2 0.155 0.446 4.424		4.424	1.667	
Cutting dates	ates 1 179.300*		29.216*	270.681*	119.439*
Error 2		1.912	0.146	1.904	0.696

Table 1.	Mean sour	ares of varian	ce analysis for	some compoi	nents of fenugreek.
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<sup>N.S</sup>: not significant,\*: significant

Table 2. Mean squares of variance analysis for forage yield of fenugreek.

S.O.V	d.f	Fresh forage yield (t/h)	Dry forage yield (t/h)	Dry leaf yield (t/h)	Dry stem yield(t/h)
Block	2	0.0208	0.000005	0.00013	0.00108
Cutting dates	1	0.601 <sup>N.S</sup>	0.589693*	0.057624*	0.184451*
Error	2	0.1027	0.00216	7E-07	0.0004

<sup>N.S</sup>: not significant,\* significant

Data in table 3 displayed that the impact of cutting dates on growth characters of fenugreek. There was a statistical difference between treatments in the growth characters of fenugreek. The means of growth traits were ranged from 35.40 to 46.40, 18.46 to 22.87, 17.02 to 30.45 and 17.74 to 26.66 for plant height, dry weight of leaf, dry weight of stem and dry matter, respectively. Regarding the

characters: plant height, dry weight of leaf, dry weight of stem and dry matter, second cutting date exhibited the highest values, while the first cutting date gave the lowest values. The results indicated that the growth traits increased as cutting dates delayed across growing season. These results were in agreement with the results of [14].

Table 3.	Effect of	cutting	dates o	n some	compo	onents o	of fenug	reek.
I upic ci	Direct of	cutting	unico o		compo		/ icinus	

Treatments	Plant height (cm)	Dry weight of leaf (%)	Dry weight of stem (%)	Dry matter (%)
First cutting (24/4)	35.40	18.46	17.02	17.74
Second cutting (4/5)	46.40	22.87	30.45	26.66
LSD.	4.858	3.83	4.848	2.931

Data represented in the table 4, explain the affecting of cutting dates on yield characters of fenugreek which was found to be significant for all characters except fresh forage yield. The value of cutting varied from 6.90 to 7.537, 1.19 to 1.821, 0.220 to 0.416 and 0.204 to 0.554 t/ha for fresh forage yield, dry forage yield, dry leaf yield and dry stem

yield, respectively). In agreement with Korla and Saini [15]. The second cutting date gave maximum values with 7.537, 1.821, 0.41 and 0.554 t/ha for fresh forage yield, dry forage yield, dry leaf yield and dry stem yield, respectively. These great values of yield **Table 4. Effect of cutting dates on forage yield** 

characters due to the increasing growth period were agreed with the previous result who found that highly significant differences were observed in forage yield due to date of harvest and genotype, this also agreed with results obtained by PeimanZandi [16].

Cable 4. Effect	ct of cuttin	g dates on	forage yield	l of fenugre	ek.

Treatments	Fresh forage yield (t/ha)	Dry forage yield (t/ha)	Dry leaf yield (t/ha)	Dry stem yield (t/ha)
First cutting (24/4)	<b>utting (24/4)</b> 6.904		0.220	0.204
<b>Second cutting (4/5)</b> 7.537		1.821	0.416	0.554
LSD.	N.S	0.163	0.009	0.071

# CONCLUSIONS

From the results of current work, we concluded that the second cutting date gave the maximum forage yield than the first cutting date, thus we recommend that the fenugreek is a cheap source of fresh forage during the fresh forage deficient period in the region and the optimum cutting time is required to produce higher forage yield.

## **REFERENCES:**

1. Islam, M. A. 2013. Fenugreek has potential to use as a forage crop. UC Cooperative Extension, Plant Sciences Department, University of California, Davis, CA 95616.

2. Acharya, S., A. Srichamroen, S. Basu, B. Ooraikul and T. Basu, 2006. Improvement in the Nutraceutical Properties of Fenugreek (*Trigonella foenum-graecum* L.). Songklanakarin J. Sci. Technol., 28(1): 1-9.

3. Petropolus, G.A., 2002. Fenugreek (The genus *Trigonella*). 1<sup>st</sup> Edition. Taylor & Francis. London and Newyork, pp: 105. 4

4. Eidi, A., M. Eidi, M. Sokhteh, 2007. Effect of fenugreek seeds (*Trigonella foenum-graecum L.*) on serum parameters in normal and streptozotocin-induced diabetic rats. Nutrition research, 27: 728-733. 5. Srinivasan, K., 2006. Fenugreek (*Trigonella foenum-graecum*): A Review of Health Beneficial Physiological Effects. *Food Reviews International*, 22: 203–224.

- 6. Abdelgani, M. E., E. A. E. Elsheikh, N. O. Mukhtar, 1999. The effect of Rhizobium inoculation and chemical fertilization on seed quality of fenugreek. Food Chemistry, 64: 289-293.
- 7. Sadeghzadeh-Ahari, D., A.K. Kashi, M.R. Hassandokht, A. Amri, Kh. Alizadeh, 2009. Assessment of drought tolerance in Iranian fenugreek landraces. Journal of Food, Agriculture & Environment, 7(3&4): 414-419.
- 8. Slinkard, A.E., R. McVicar, C. Brenzil, P. Pearse, K. Panchuk, S. Hartley,2009. Fenugreek in Saskatchewan, Saskatchewan Agriculture, University of Saskatchewan. Revised by: Dale Risula, Saskatchewan Agriculture.
- 9. <u>Acharya S. N.</u>, J. E. Thomas & <u>S. K. Basu</u> ,12 Dec 2011. Fenugreek: an "old world" crop for the "new world" Pages 27-30, Journal <u>Biodiversity</u>,volume 7, 2006 - <u>Issue</u> <u>3-4</u>.

10. Anton R. and S. Cunningham, 2010. Growing Fenugreek (Trigonella foenumgraecum), Garden organic. www.sowingnewseeds.org.uk 11. Nandal, J. K.; Dahiya, M. S.; Vishal Gupta; Dharam, 2007,, Response of sowing time, spacing and cutting of leaves on growth and seed yield of fenugreek., CCS Haryana Agricultural University, Hisar - 125 004, Haryana, India. Haryana Journal of Horticultural Sciences 2007 Vol.36 No.3/4 pp.374-376.

12. Mickan and T. Farran, (2009) "Cereals – Know when to cut: Making Cereal Silage", Dairy Extension Centre, collaboration between DPI, DI & PIRSA: pp.1-7.

13. Korla, B.N. and Saini, Amit (2003). Effect of dates of sowing and cutting on seed yield of fenugreek. *Haryana Journal of Horticultural Sciences*, 32: 120-122. 14. S.C.Rana, V.K.Pandita and Sanjai Sirohi ,2015,Influence of spacing and number of leaf cuttings on seed yield in fenugreek, ISSN:0250-5371 / Online ISSN:0976-0571, AGRICULTURAL RESEARCH COMMUNICATION CENTRE, Karnal-132 001, India. DOI: 10.18805/lr.v38i6.6737

15. Korla, B.N. and Saini, Amit (2003). Effect of dates of sowing and cutting on seed yield of fenugreek. *Haryana Journal of Horticultural Sciences*, 32: 120-122.

16. PeimanZandi, Amir HosseinShirani Rad and Leila Bazrkar- Khatibani, 2011. Agronomic study of fenugreek grown under different inter-row spacing and nitrogen levels in a paddy field of Iran. *Am-Euras. J. Agric. & Environ. Sci.*, 10(4): 544-550.