
(// : // :)

ADF

()

()

MSTAT – C

ADF

ADF

...

(ME)

(CP) ()
(NDF)

()

ADF

()
(TDN)

() () ()
()

(DMD)

()

()

()

Metabolizable Energy

Biondioni (1986)

Crude Protein

Natural Detergent Fiber

Arzani (1994)

Total Digestibel Nutrient

Dry Mater Digestible

Garza and Fulbright (1988)

()

()

Rayburn (1977)

Ranjhan (1997)

Pinkerton (1990)

Cook et al. (1952)

Stoddart et al. (1975)

()

Lithosols ,

() Calcic Cambisols, Calcaric Regosols

()

()

()
)

(

Stachys inflata , *Thymus kotschyanus* ,
Artemisia austriaca , *Kochia prostrata* ,
Acanthus dioscoridus , *Galium verum* ,
Paronychia kurdica , *Prangus ferulacea* ,
Astragalus effesus , *Trifolium repens* ,
Lotus corniculatus , *Coronilla varia* ,
Medicago sativa , *Onobrychis sativa* ,
Melica jaquemontii , *Stipa barbata* ,
Festuca ovina , *Koeleria cristata* ,
Agropyron elongatum , *Bromus tomentellus* ,
Dactylis glomerata , *Hordeum violaceum* ,
Poa bulbosa .

Bromus

tomentellus – *Festuca ovina*

NJ 38–10

A6M1

Chen et al. (2001)

Dongmei et al. (2001)

...

(CP)

(ADF)

() (1990) AoAc

:

(CP)

/

(N)

ADF

()

x x x
x x

()

Onobrychis sativa

]

Poa bulbosa

(CP)

(ADF)

)

(... B A)

()

)

(

MSTAT - C

(/)

.. (/)

(ADF)

ADF

F				
/ ns	/	/		
	/	/		/
/ **	/	/		
/ ns	/	/		×
	/	/		
/ **	/	/		
/ ns	/	/		×
/ **	/	/		×
/ *	/	/		× ×
	/	/		
		/		

*

**

ns

()

ADF

×

()

×

×

×

×

()

()

ADF

ADF

()

(/)

(/)

()

Khalil et al.(1986)

Norton (2000)

Dongmei et al. (2001)

Arzani(1994)

Buxton (1994)

(.)

/ L / R	/ M / R		<i>Stachys inflata</i>
/ N / ST	/ O / TU		<i>Thymus kotschyanus</i>
/ I / NO	/ HI / NO		<i>Artemisia austriaca</i>
/ MN / Y	/ OP / XY		<i>Kochia prostrata</i>
/ K / V	/ L / V		<i>Acanthus discoridus</i>
/ L / U	/ MN / U		<i>Galium verum</i>
/ J / PQ	/ IJ / QR		<i>Paronychia kurdica</i>
/ H / QR	/ G / Q		<i>Prangus ferulacea</i>
/ D / H	/ D / G		<i>Astragalus effesus</i>
/ E / K	/ DE / L		<i>Trifolium repens</i>
/ F / L	/ E / M		<i>Lotus corniculatus</i>
/ B / J	/ B / JK		<i>Cornilla varia</i>
/ C / J	/ C / K		<i>Medicago sativa</i>
/ A / G	/ A / F		<i>Onobrychis sativa</i>

/ S / W	/ S / W		<i>Melica persica</i>
/ U / XY	/ U / XY		<i>Stipa barbata</i>
/ L / OPQ	/ M / PQ		<i>Festuca ovina</i>
/ I / NOP	/ H / O		<i>Koeleria cristata</i>
/ R / YZ	/ R / XY		<i>Agropyron elongatum</i>
/ LM / ST	/ M N / S		<i>Bromus tomentellus</i>
/ R / VW	/ R / W		<i>Dactylis glomerata</i>
/ T / WX	/ T / X		<i>Hordeum bulbosum</i>
/ Y / Z	/ Y / Z		<i>Poa bulbosa</i>

ADF

F				
/ ns	/	/		
	/	/		/
/ **	/	/		
/ ns	/	/		×
	/	/		
/ **	/	/		
/ ns	/	/		×
/ **	/	/		×
/ ns	/	/		× ×
	/	/		
		/		

**

ns

()

()

()

()

NDF

ADF

NDF

ADF

NDF

ADF

ADF

ADF

()

()

()

()

)

()

(

()

()

()

()

()

()

() ()

)

(

x x

x x

x

ADF

()

Agropyron

()

desertorum

x

ADF

()

Agropyron

desertorum

/

()

Festuca

ovina , *Bromus tomentellus*, *keoleria cristata*

x x

ADF

ADF

ADF

:()

:()

:()

:()

()

:()

:()

15-Arzani, H., 1994. Some aspects of estimating short term and long term rangeland carrying capacity in the western division of New South Wals. Ph.D.Thesis, University of New South Wals, Australia, 308 pp.

16-Arzani, H., Zohdi, M., Fish, E., Zahedi Amiri, G.H.,Nikkhah, A., & Wester, D., 2004. Phenological effects on forage quality of five grass species. *Journal of Range Management*, 57(6): 624-630.

17-AOAC, 1990. Official methods of analysis.13th ed., Association of Official Analytical Chemsits, Washington, D.C., 600 pp.

18-Angell, R.F., Miller, R.F., & Haferkamp, M.R., 1990. Variability of crude protein in crested wheatgrass at defined stages of phenology. *Journal of Range Management*, 43:186-189.

19-Biondioni, M., Pettit, R.D., & Jones, V., 1986. Nutritive value of forages on sandy soils as affected by tebulhiurn, *Journal of Range Management*, 39(5): 396-399.

20-Broderick, G.A., & Cochran, R.C., 1999. Invitro and Insitu method for estimating digestibility with reference to protein degradability, Publishing, U.k., p:53-86.

21-Buxton, D.R.,& Fales, S.L.,1994. Plant environment and quality, Proc. Natl. Conf. Forage quality evaluation and utilization; Nebraska; p:155-184.

22-Chen, C.S., S.M.,Wang & Y.K.,Chang, 2001.Climatic factors, Acid Detergent Fiber, Natural Detergent Fiber and Crude Protein Contents in Digitgrass, Proceeding of the XIX International Grassland Congress, Brezil, 758 pp.

23-Cook, C.W., Stoddart, L.A., & Harris, L.E., 1952. Determing the digestibility and metabolisable energy of winter range plant by sheep. *Journal of Animal Scinece*, p:578-590.

24-Dongmei, X.c., Weixian, G., & Xiangyun, X., 2001. Studies on feeding value for five psammophyte shrub in ningxin region, proceeding of the XIX International Grassland Congress, Brazil, 758 pp.

25-Garza, A., and, T.E., 1988. Comparative chemical composition of armed saltbush and fourwing saltbush. *Journal of Range Management*, 43:401-403.

26-Ghadaki, M.B., Van Soest, P.Y., Mcdowell, R.E., & Malekpour, B., 1974. Composition and In-vitro digestibility of some arid zone forage from Iran, In: XII International Grassland Congress, vol.III, part 1, Moscow, p:542-549.

27-Khalil, J.K., Saxaya,W.N., & Heyder,S.Z.,1986. Nutrient Co, pasition of Atriplex leaves growing in Saudi Arabic, Journag of Range Management, 30:204-107.

28-Norton, B.W., Waterfall, M.H., 2000. The nutrient value of tipuna tiou and calliandra calochrasus as supplements to low-quality straw for goats, *Small Ruminant Research*,38(2):175-182.

29-Pinkerton, B.,1999. Forage quality,coperative extension service, Clemson University, 170 pp.

30-Ranjhan, S.K.,1997. Animal nutrition in the tropics,Vikas Publishing House, 202 pp.

...

31-Rauzi, F.,1975. Seasonal yield and chemical composition of crested wheatgrass in South Eastern Wyoming. *Journal of Range Management*, 28:211-219.

32-Rayburn, E.B., 1997a. Forage quality-fiber and energy, forage-livestock systems, West Virginia Cooperative Extension Service, 125 pp.

33-Rayburn, E.B., 1998b. Using a forage test to identify improvements in forage management, forage-livestock systems, West Virginia Cooperative Extension Service, 64 pp.

34-Stoddart, L.A., & Box, T.W., 1975. *Range Management*, 3rd ed., McGraw-Hill Company, New York, 532 pp.

35-Van Soest, P.J.,1963. Use of detergents in the analysis of fibrous feeds, II, A rapid method for the determination of fiber and lignin, *Journal of the Association of Official Agricultural Chemists*, 46: 829-835.

Investigation of Phenological Stages and Harvest Year on Forage Quality of Rangeland Species in West Azarbaijan Province

J. Torkan¹, A. Alijanpoor², I. Bernosi³, H. Fajri⁴ and H. Nazarnejad⁵

¹ Ph.D. Student of Range Management, Faculty of Natural Resources, University of Tehran, I. R. Iran.

² Assistant Prof, Faculty of Natural Resources, University of Urmia, I. R. Iran.

³ Assistant Prof, Faculty of Agriculture, University of Urmia, I. R. Iran.

⁴ Associate Prof, Faculty of Agriculture, University of Urmia, I. R. Iran.

⁵ Instructor, Faculty of Natural Resources, University of Urmia, I. R. Iran.

(Received 2006 Oct 8, Accepted 2007 Nov 19)

Abstract

In this research, in order to determine the nutritional value of important vegetation species in certain climates, samples were selected from among 23 palatable and important plants that generally found in the ranges under consideration. The sampling was performed in two phenological stages in years 2004 and 2005. Then, the samples were chemically analyzed for the determination of their nitrogen and ADF content. The split plot method was used for the statistical analysis of data with respect to the arrangement of randomized complete block design in three replications of 46 treatments in each location. Plant species were taken as main factors and the growth stage was considered as the secondary factor and ranges played the role of replication. The characteristic studied was the forage quality (nutritional value) of the plants in various phenological stages in the course of two growth seasons. Following collecting data, in order to examine changes in forage quality of the species in various phenological stages and as well the mutual effects of the harvest year on the forage quality, the combined variance was analyzed using MSTAT-C software program and mean values were compared based on the Dunken test. Results show that chemical composition of the plants studied varies considerably and the phenological stage affects the forage quality significantly. Statistically, a significant difference between ADF content of the species in various phenological stages was not observed so that the study showed changes in a certain species in the years under consideration follow a single trend. The protein content of the species in different phenological stages of the harvest years also varied significantly.

Key Words: Phenological stages, Harvest year, Forage quality, Crude protein, Acid Detergenet Fiber