Chemical Composition and Seasonal Yield of *Koeleria cristata* in West Azarbaijan Grasslands of Iran

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Key words: Iran, chemical composition, seasonal yield, *Koeleria cristata*

Introduction Chemical analysis of rangeland species can be used to estimate the quality and suitability for livestock feed. Sullivan (1962) stated, " the problem of evaluation of forage by chemical analysis is a long way from being solved and though progress has been made, contradictory opinions are to be found in the literature." Although chemical analysis does not provide an accurate evaluation of forage quality, it does give a reliable estimate at less cost than the standard evaluation methods of grazing animal or digestion trials (Frank, 1975). The purpose of this study was to determine seasonal yields, crude protein (CP), and mineral content of *Koeleria cristata* as related to climate and plant maturity.

Material and methods Three subplots were randomly selected in each of four replication plots on each harvest date. All forage in the subplots was clipped at ground level, and all material except current growth of *Koeleria cristata* was discarded. *Koeleria cristata* forage was air dried, weighed, and yields expressed in Kg/ha. Five clipping were made each year in 2003, and 2005 at 2-week intervals from late April through October. Data on forage yield, CP, and mineral concentration of the *Koeleria cristata* were analyzed by analysis of variance. Correlations between forage yields and CP, and the mineral constituents were determined (Torkan et al., 2007).

Results and discussion Forage yields, CP levels, and mineral concentrations of *Koeleria cristata* were influenced by phenological development and distribution of precipitation. CP levels, and mineral concentrations in the *Koeleria cristata* declined with plant maturity (Table 1). Amount and distribution of the precipitation enhanced or retarded phonological development. Mineral concentration in forage varied inversely with yields (r=-0.83).

Table 1 *CP, calcium, phosphorous, and potassium concentrations (%) in Koeleria cristata for five phonological stages of growth, and harvest dates for 2 years, in West Azarbaijan grasslands of Iran.*

Year and constituent		Annual precipitation (mm)	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Year mean
CP	2003	427.3a	25.8a*	21.6ab	17.8b	12.6c	9.4c	17.4a
	2005	436.2b	18.2a	16.7b	13.1c	10.5c	7.8d	13.3b
	Average		22a	19.2b	15.5c	11.6d	8.6e	--
Calcium	2003	427.3a	0.50a	0.40b	0.39b	0.35b	0.26c	0.38a
	2005	436.2b	0.34a	0.35a	0.33b	0.33b	0.24c	0.31b
	Average		0.43a	0.38ab	0.34b	0.34b	0.25c	--
Phosphorous	2003	427.3a	0.25a	0.20c	0.23b	0.22b	0.20c	0.22a
	2005	436.2b	0.21a	0.22a	0.22a	0.22a	0.17b	0.21a
	Average		0.23a	0.21ab	023a	0.22b	0.19c	--
Potassium	2003	427.3a	2.63a	2.39b	2.10c	2.05c	1.66d	2.17a
	2005	436.2b	1.73c	1.82b	1.80b	1.92a	1.50d	1.75b
	Average		2.18a	2.11a	1.95b	1.99b	1.58c	--
Herbage yields (Kg/hec.)**		--	50.5c	61.3c	94.1b	108a	119a	--

* Numbers with the same letter are not significantly different at the 5% levels.
** 2-Air dried plant material average for 2 years.

Conclusions It is generally assumed that soil and air temperature, and amount distribution of precipitation, influence forage yields in the early spring. Cheyenne air temperatures were low before the first harvest date, and precipitation was erratic. Usually, as the season progresses, soil and air temperature increase; then precipitation and plant nutrient become limiting for forage production (Frank, 1975). From a nutritional standpoint grazing of *Koeleria cristata* in West Azarbaijan grasslands should be between the immature and full bloom stage as the minerals and crude protein decline rapidly with plant maturity. When used for hay, *Koeleria cristata* should be harvested no later than the full bloom stage of growth for best combination of yield, crude protein, and mineral content((Frank, 1975 and Arzani et al., 2001).

References

Arzani, H., Torkan, J., Jafari, M., Jalili, A., Nikkah, A., 2001. Effects of phonological stages and ecological factors on forage quality of some range species. *Iranian J. Agric. Sci.*, 32, 385-397.

Frank, R., 1975. Seasonal yield and chemical composition of crested wheatgrass in Southeastern Wyoming. *J. Range Manage*. 28, 219-221.

Torkan, J., Nazarnejad, H., Bernisi, I., and Fajri, H., 2007. Investigation of phenological stages and harvest year on forage quality of rangeland species in West Azarbaijan Province. *Accepted Iranian J. Nat. Resour*. Vol. 60, No. 4.