



A SURVEY OF NUTRITIVE VALUE OF GRAMINEA RANGE SPECIES IN KERMAN PROVINCE, IRAN

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Abstract

In order to determine the chemical composition and digestibility of dominant Graminea species, eight species including: *Stipa barbata*, *Bromus tectorum*, *Stipagrostis plumosa*, *Bromus danthonia*, *Teaniatherium crinitum*, *Stipa capensis*, *Aeluropus littoralis* and *Aeluropus lagopoides* were sampled at flowering and mature stages, throughout the Kerman Province in south-eastern of Iran. All samples were chemically analysed according to the standard methods and the digestibility was measured using of *in vitro* technique. Average crude protein (CP) content of two stages of sampling was between 7.5 to 10.1 percent in dry mater (DM) with the lowest for the *T. crinitum* and the highest amount for the *A. lagopoides*. There were no much variation between the flowering and seedling stages for the CP content of the above mentioned plants except for the species *S. capensis*, which had 6.6 and 11.8 percent of CP at flowering and seedling stages respectively. The concentration of ether extract (EE) varied from 0.73 to 1.16 percentage in DM and the ash content of the samples were different from 6.3 percent for the *S. barbata* to 12.9 percent for *A. lagopoides*. Neutral detergent fibre (NDF) and acid deteregent fibre (ADF) were between 66.9 to 80.6 and 38.8 to 51.0 percent respectively whcich, were different among the plants. *S. barbata* had the highest amount NDF and ADF concentration, but the species *A. lagopoides* and *B. danthonia* had the lowest amounts of NDF and ADF respectively, but a relatively similar concentration of NDF as well as ADF were observed in both stages of sampling for each species. The average digestibility of DM and OM of two stages were 39.1 and 40.3, 63.6 and 65.5, 42.8 and 44.5, 63.0 and 64.4, 51.0 and 52.8, 33.7 and 39.5, 37.1 and 38.4, 48.4 and 46.6, for the eight species respctively. The average TDN content of two stages of the plants was 47.8, 56.9, 52.7, 57.4, 53.5, 57.5, 55.8 and 54.4 percent respectively. There were no much changes between the flowering and seedling stages of the herbage for digestibility and TDN content. The estimated DE and ME were 2.1 and 1.7, 2.5 and 2.1, 2.3 and 1.9, 2.5 and 2.1, 2.4 and 1.9, 2.5 and 2.1, 2.5 and 2.0, 2.4 and 2.0 Mcal/kg for the mentioned species respectively, wcich were the lowest for *S. barbata* (2.1 and 1.7 Mkal/kg) and the highest for the *B. dantonio* and *S. capensis* (2.5 and 2.1 Mkal/kg). It can be concluded that the dominant graminea herbage in dry-land Kerman area in Iran at the stages of flowering and seedling contained CP and energy enough for the extensive system grazing small ruminants in the area.

Key word: Nutritive value - range – graminea species – kerman - Iran

INTRODUCTION

Shortage of feed resources often impose major constrains on the development of animal production in dry land areas such as majority of parts in Iran. However, the concept of matching small ruminant livestock production with available feed resources, needs therefore intensified research into optimum use of local feed resources. In this situation, optimum utilization of limited feed resources is based on available information about the locally feeds. Range plants are very important resources that are used as forage for ruminant in many parts of the world. However, development of forage production plans and improvement of balance nutrition systems for livestock, need information of the nutritive value of range plants. The nutritive value of herbage depends not only on the growth or maturity of the plants, but also



on the seasonal variation and climatic conditions. The nutrient contents are much different between legumes and grasses. Additionally, the variation among the grasses for nutrient content may be important. Grasses grown on tropical zones contain lower available energy than that of temperate zone. The nutritive value of a specific range plant may be affected by the variation among the soils, rainfall, temperature, and other ecological conditions. The nutritive value of forages as well as herbage can be determined by their chemical composition, digestibility and palatability or by a combination of chemical constituents and *in vitro* techniques of digestibility. There is limited information on the nutritive value of range plants in Kerman province, beside this region is one of the relatively vast dry area of Iran. The objective of this study was to assess the potential nutritive value of eight dominant grasses available in rangelands of Kerman province, Iran.

MATERIAL AND METHODS

In order to determine the chemical composition and digestibility of dominant graminea species, eight grasses of : *Stipa barbata*, *Bromus tectorum*, *Stipagrostis plumosa*, *Bromus danthonia*, *Teaniatherium crinitum*, *Stipa capensis*, *Aeluropus littoralis*, and *Aeluropus lagopoides* were sampled at flowering and seedling stages from different range of Kerman province, in south-eastern of Iran. The collected samples were transferred to the laboratory in silled packs and dried in room condition. The samples were milled and stored for chemical analysis. Sub-sample (about 20 g) were taken from each sample and milled, through 1-mm sieve. DM of air-dry samples was determined in 105°C for 48hr and the final dry matter (DM) of samples was calculated through two-stage DM determination. Organic matter (OM) was measured by ashing the samples at 500°C for 24hr. Crude protein (CP) was analysed by Kejltek Auto 1030 analyser (N×6.25) and cell wall component including neutral detergent fibre (NDF) and acid detergent fibre (ADF) were determined by using the methods of Van Soest *et al.* (1991). The Digestibility of dry matter (DMD) was measured using of *in vitro* two stage Tilly and Terry (1963) method with two replicate, but total digestible nutrients (TDN) as well as digestible energy (DE) and metabolizable energy (ME) were estimated using of the equations below:

$$DE \text{ (Mcal/kg)} = 0.027 + 0.0427 \times (\text{DMD})$$

$$ME \text{ (Mcal/kg)} = 0.821 \times DE$$

$$\text{TDN} = DE \text{ (Mcal/kg)} \div 0.4409$$

RESULTS

Average CP content of two stages of sampling was between 7.5 to 10.1 percent in DM with the lowest for the *T. crinitum* and the highest amount for the *A. lagopoides*. There were no much variation between the flowering and seedling stages for the CP content of the above plants except for the species *S. capensis*, which had 6.6 and 11.8 percent of CP at flowering and seedling stages respectively. The concentration of ether extract (EE) varied from 0.73 to 1.16 percentage in DM and the Ash content of the samples were different from 6.3 percent for the *S. Barbara* to 12.9 percent for *A. lagopoides*. The NDF and ADF were between 66.9 to 80.6 and 38.8 to 51.0 percent respectively which, were different among the plants. *S. barbata* had the highest amount of NDF and ADF concentration, but the species *A. lagopoides* and *B. danthonia* had the lowest amounts of NDF and ADF respectively, but a relatively similar concentration of NDF as well as ADF were observed in both stages of sampling for each species.

The average digestibility of DM of two stages were 39.1 and 40.3, 63.6 and 65.5, 42.8 and 44.5, 63.0 and 64.4, 51.0 and 52.8, 33.7 and 39.5, 37.1 and 38.4, 48.4 and 64.6, for the eight species respectively. The average TDN content of two stages of the plants was 47.8,



56.9, 52.7, 57.4, 53.5, 57.5, 55.8 and 54.4 percent respectively. There were no much changes between the flowering and seedling stages of the herbage for digestibility and TDN content. The estimated DE and ME were 2.1 and 1.7, 2.5 and 2.1, 2.3 and 1.9, 2.5 and 2.1, 2.4 and 1.9, 2.5 and 2.1, 2.5 and 2.0, 2.4 and 2.0 Mcal/kg for the mentioned species respectively, which were the lowest for *S. barbata* (2.1 and 1.7 Mcal/kg) and the highest for the *B. dantoniana* and *S. capensis* (2.5 and 2.1 Mcal/kg).

CONCLUSION

It can be concluded that the dominant grasses in dry-lands of Kerman the stages of flowering and seedling contained CP and energy enough for the extensive system grazing small ruminants in the area. However the number of livestock per acer is very important to let the livestock to be able receiving enough forage, during grazing season and keep the range land in a balance status.

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Table No. 1: Chemical composition, digestibility and energy content of eight species of gramine herbage

Species	stage	Chemical composition (%)					Invitro Digestibility (%)		Energy	
		CP	Ash	EE	NDF	ADF	DM	OM	ME (Mcal/kg)	TDN (%)
<i>Stipa barbata</i>	F	8.43	6.02	0.94	79.62	50.42	38.70	40.42	1.76	48.65
	S	8.60	6.52	0.88	81.44	51.54	39.41	40.08	1.70	46.86
	M	8.24	6.27	0.92	80.55	50.98	39.06	40.25	1.73	47.76
<i>Bromus tectorum</i>	F	10.40	8.26	1.10	69.70	38.60	65.05	67.10	2.08	57.57
	S	9.62	7.54	0.97	77.36	40.42	62.06	63.98	2.03	56.20
	M	9.49	7.90	1.02	73.53	39.51	63.55	65.54	2.06	56.88
<i>Stipagrostis plumosa</i>	F	8.99	7.03	0.87	77.89	46.12	45.36	47.54	1.88	51.80
	S	8.18	7.93	1.10	79.49	44.60	40.20	41.41	1.93	53.47
	M	8.59	7.48	0.98	78.69	45.36	42.78	44.47	1.90	52.68
<i>Bromus dantoniana</i>	F	8.76	7.95	0.52	73.37	38.84	62.25	63.69	2.08	57.38
	S	8.98	8.05	0.93	86.85	38.82	63.73	65.04	2.08	57.44
	M	8.89	8.00	0.73	75.11	38.83	62.99	64.37	2.08	57.41
<i>Teanitherium crinitum</i>	F	8.25	9.12	0.92	73.69	44.78	57.39	60.11	1.92	52.92
	S	6.80	10.06	0.80	73.05	43.41	44.02	45.53	1.95	53.96
	M	7.52	9.59	0.85	73.48	44.09	50.70	52.82	1.93	53.48
<i>Stipa capensis</i>	F	6.56	6.56	1.11	70.86	41.50	29.54	35.78	2.00	55.34
	S	11.81	10.92	1.17	66.88	40.76	37.80	43.21	2.16	59.65
	M	9.18	8.74	1.14	68.87	41.13	33.67	39.50	2.08	57.49
<i>Aeluropus Littoralis</i>	F	11.02	11.31	1.26	71.43	37.76	35.90	33.06	2.11	58.29
	S	7.52	11.47	1.07	70.53	44.13	38.27	43.68	1.93	53.30
	M	9.27	11.39	1.16	70.98	40.94	37.08	38.37	2.02	55.79
<i>Aeluropus lagopoides</i>	F	10.32	13.38	0.99	67.33	45.64	51.24	48.59	2.04	56.48
	S	9.97	12.47	0.95	66.48	40.18	45.58	44.69	1.90	52.39
	M	10.14	12.92	0.97	66.90	42.82	48.41	46.64	1.97	54.43