

Factors affecting forage quality of native species in Iranian rangelands

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Introduction Animal performance is closely correlated with the nutrient value of the forage available and this is affected by different factors (Arzani *et al.*, 2001). Crude protein content (CP), digestible dry matter (DDM) and metabolisable energy (ME) were considered particularly appropriate for evaluation of range forage quality. This paper reports on factors affecting the forage quality of range species grown in Iran.

Material and methods Four main types of experiments were conducted. The first experiment investigated the effects of climate, soil, and phenological stage on quality of five grass species - *Agropyron tauri* (Agta), *Agropyron trichophorum* (Agrt), *Bromus tomentellus* (Brto), *Festuca ovina* (Feov) and *Hordeum bulbosum* (Hobu). In the second experiment, the proportions and quality characteristics of plant parts in different phenological stages were measured. In the third experiments key factors for forage quality assessment were determined and in the fourth experiment the effects of location on forage quality at the same time of year were investigated.

Results Analysis of variance showed that environmental conditions affect forage quality. The magnitude of the effects ranked in the order phenological stage (greatest effect), climate and soil characteristics (least effect). Nutritive values differed significantly ($P<0.05$) both within and among plant parts and phenological stages. For each species, the leaves had the highest nutritive value. Based on correlation between factors, measurements of crude protein and acid detergent fiber are more important than others. Forage components (%) varied between species, within and among phenological stages (eg. Table 1).

Table 1 Interaction between species (sp.), phenological stage (St.) and climate (Cl.) and chemical composition

Sp.*St.*Cl.	St.*Cl.	Sp.*Cl.	Sp.*St.	Climate	Stage	Species	Variation
ns	ns	ns	ns	***	**	***	Ash%
ns	ns	***	***	***	***	**	Nitrogen%
ns	ns	***	***	***	***	***	CP%
ns	ns	ns	*	ns	ns	**	E%
**	ns	**	***	ns	***	***	CF%
**	ns	ns	***	*	***	**	ADF%
ns	ns	ns	**	ns	***	***	NDF%
ns	ns	ns	**	ns	ns	**	ME(Mj/kgDM)
ns	*	ns	**	ns	***	**	Cu(ppm)
ns	ns	*	**	ns	***	ns	Fe(ppm)
ns	ns	ns	ns	ns	***	***	Zn(ppm)
ns	ns	**	***	**	ns	***	Mn(ppm)
**	ns	***	***	***	***	***	Mg%
***	ns	*	**	**	***	***	K%
ns	ns	ns	ns	ns	ns	ns	Na%
ns	ns	*	**	*	***	ns	P%
*	ns	*	*	*	***	***	Ca%

N ns non significant; *($p<0.05$); **($p<0.01$); ***($p<0.001$)

Discussion The nutrient value of available forage depends on the plants present because different species had different nutrient values. Seasonal condition is important because this influenced the species present and their composition (Orr & Holmes, 1984). Arzani *et al.*, (2001) also reported that with progress of plant growth, the ratios of tissues giving protection and rigidity increased. Therefore, structural carbohydrates and fibre contents increased with increased plant maturity late in the growing season. Forage with higher leaf to stem ratio would result better animal performance. This is an important factor for selecting the correct time of grazing.

References

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