# Comparison of Forage Quality of *Astragalus effusus* Bunge at Three Growth Stage, Management Systems

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**Key word :** Rangelands ,*Astragalus effusus* Bunge ,forage quality , grazing intensity ,Iran

**Introduction** Among more than 800 , *Astragalus* species that are existed in Iran , a few of them are forb , palatable and contribute to the feeding of livestock , including *Astragalus effusus* Bunge . As a grazing tolerant , nutrient rich and prostrate species that have an undeniable role in soil conservation and animal feeding , it deserves serious consideration . This study aims at investigation of forage quality of this species at three , growth stage and management systems .

**Material and methods** This study was conducted in Chaharmahal-va-Bakhtiari province (50° , 41′ N and 32° , 43′ E , ca . 320 ha , 2144m *a .s .l .*) , Iran . Within this area , three management systems including exclosure , moderate grazing ( 1-year rest-rotational grazing system with 1 AU/ha) and extensive grazing (whole year grazing with 1 .7 AU/ha) are implemented . Within each management system one representative area was selected and within that , one transect of 50-m long was established . At three growth stages including vegetative , flowering and seeding , 5 samples along each transect was randomly selected , cut at ground level and put in paper bags and bring into laboratory for chemical analysis . Samples were oven dried at 65℃ , ground to pass through a 0 .8-mm screen . The Crude protein (CP) content was determined using the Kjedahl method (AOAC 1984) . Crude Fiber (CF) was determined using the method described by AOAC (1984) . Data analysis was done by SPSS v .15 (SPSS Inc . , Chicago , USA) using a full factorial model , where growth stage and management systems were regarded as fixed factors and CP and CF were separately considered as dependent variables . Mean comparisons were done using Tukey's test .

**Result and discussions** As indicated in Figure 1 , the highest CP was found at moderate grazing in vegetative stage , where CF was at medium level , relative to other growth stages . In flowering and seeding stages , the percentages of CP was also relatively high , where , CF was medium to high . Though the number of flowers at flowering stage in extensive grazing was considerably lower than in moderate grazing and exclosure , the CP was highest in this stage and CF was lowest . This might be explained by two facts : 1) in extensive grazing , this species as a tolerant species , tries to compensate defoliation by recovering photosynthetic portion , therefore , the new stems and leaves would have a relatively higher CP , as in vegetative stage , and 2) in extensive grazing , the urination of livestock is high , thus , the amount of N and consequently CP increases . Considering the amount of CP and CF in three growth stages , it seems that moderate grazing is a better option than the other two management systems to increase forage quality .

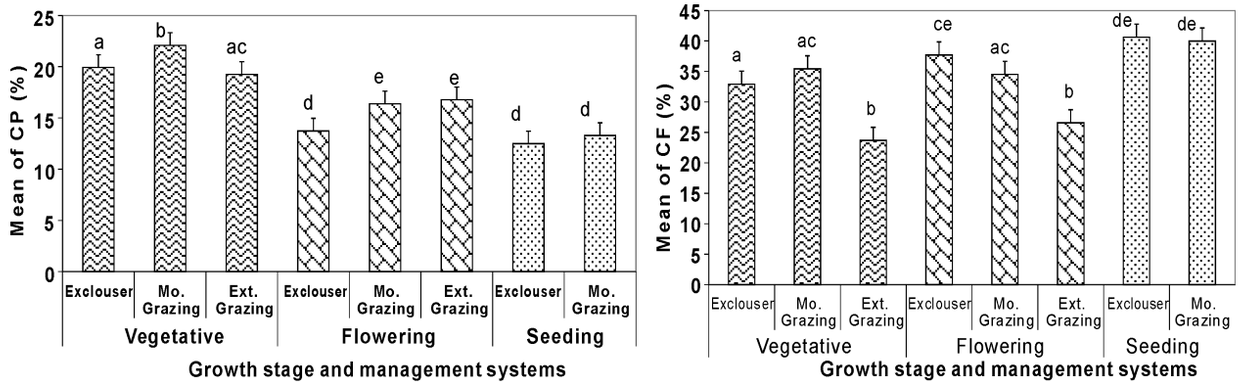


**Figure 1** *Crude protein (CP) and crude fiber (CF) as two indicators of forage quality at three growth stage and management systems . Different small letters above bars show significant ($P \leq 0.05$) differences between values .*

**Conclusion** Overall , it seems that moderate grazing is a better management option than exclosure and extensive grazing in forage quality point of view .

**Reference**

AOAC , (1984) . Association of Official Agriculture Chemists , *Official Method of Analysis* . 11th Edition , Pp . 69-88 . Virginia , USA .