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Height-weight profiles of two key species to assess utilization of grasslands in Boroujen , Iran

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Key words : Range management ; proper utilization ; rapid method ; *Bromus tomentellus* ; *Stipa lessingiana*

Introduction Considering the extent of rangelands , a rapid and accurate method is vital for regular determination of utilization . So far , several , mostly time consuming and expensive , methods have been developed to estimate rangeland utilization . Instead , the height-weight relation (Cook & Stubbendieck , 1986) is a rapid approach to determine utilization . The objective of this study was to establish height-weight profiles for two key species , *Bromus tomentellus* and *Stipa lessingiana* , to assess utilization in semi-arid grassland of Boroujen , Iran .

Materials and methods This study was conducted at Marjan , Boroujen , ($32^{\circ}0'32''N$ and $51^{\circ}7'26''E$, with ca .4600 ha , 2197 a .s . l .) . Within the study area , a representative area was selected and three transects were established , each 200-m long . Along each transect , 30 mature plants (seeding stage) of each species were randomly selected , cut at ground level after that leaves and culms were held in place by wrapping string spirally around the plant . The samples were oven dried at $65^{\circ}C$ and finally cut with 2 cm intervals and weighed . Data analysis was carried out with SPSS v .15 (SPSS Inc . , Chicago , USA) . Several linear and nonlinear regression models were tested to study the relationship between independent (cumulative height) and dependent variables (cumulative weight) .

Results Height-weight relations are influenced by species canopy structure . The main herbage mass of the two species is concentrated in their basal part . The best curve fit between height (X) and weight (Y) for the two species was cubic ($r^2=0.99$ $p \leq 0.001$) (Figure 1) .

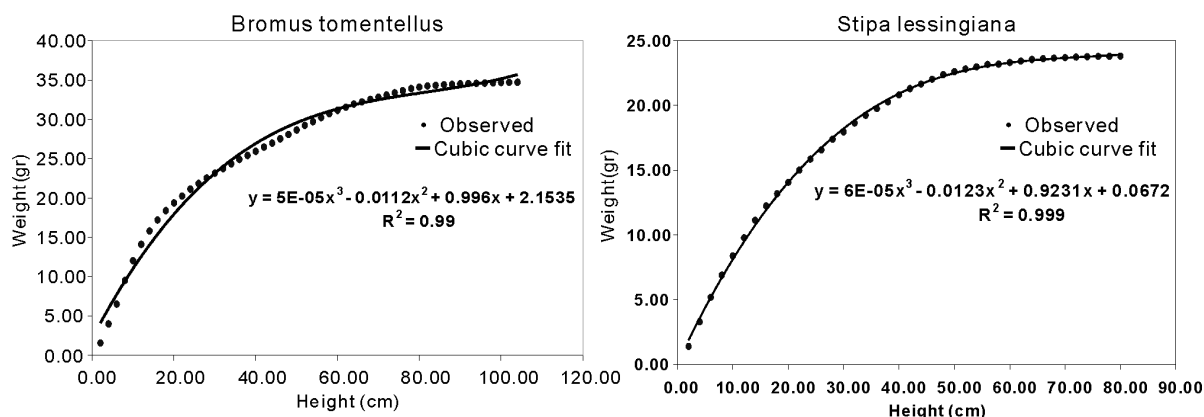


Figure 1 Height-weight relations of *Bromus tomentellus* and *Stipa lessingiana* .

Discussion The very high correlations ($r^2=0.99$ $p \leq 0.001$) between height - weight of *Bromus tomentellus* and *Stipa lessingiana* show that this method can be effectively used to determine utilization of grasses in this semi-arid grassland . Since these two species are known as the two key species of the study area (Ebrahimi , 1997) , their utilization can serve as an indicator of grazing intensity and utilization . Since grazers are selective for leaves over stems (Ganskopp and Bohnert 2006) , further work is needed to confirm the results over different sites and seasons .

Conclusion Height-weight relation as an inexpensive , non-destructive and easy method for determination of utilization , specifically where grasses are the dominant species and the pattern of defoliation is known .

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