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## Effects of different utilization levels on species richness changes in Saral grassland , Kurdistan Province

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**Key words :** species richness , reference area , key area , critical area , utilization level , Saral , Kurdistan

**Introduction** Species richness reflects the number of species in a plant community . It is one of the most important plant based evaluation indices for rangeland ecosystems (Cingolani *et al .* , 2005) . The present research was conducted to evaluate effects different utilization levels upon species richness within grasslands of the Saral region of Kurdistan .

**Materials and methods** Three areas ( reference , key and critical areas ) were selected from within the Sarel region . Species richness data were collected using Whittaker plots . Ten plots in each area were used to and data were analyzed using regression (  $S = \beta + \beta \log x + \epsilon$  ) , Where : S : average number of species in each plots ,  $\beta$  : intercept ,  $\beta$  : species richness changes per area unit ,  $\epsilon$  : error amount and x : plot size ( 0 . 1 , 1 , 10 , 100 and 1000 ) . Finally , regression coefficient (  $\beta$  ) and intercept (  $\beta$  ) were compared by using t-student statistical method together . Paired regressions showed species richness changes . Minitab13 software was used for this comparing .

**Results and conclusion** The statistical models for each area ( key , reference and critical areas ) were obtained as below :  $S_{key} = 3 . 56 + 3 . 76 \log x$  ,  $S_{Reference} = 3 . 83 + 4 . 53 \log x$  and  $S_{Critical} = 1 . 77 + 1 . 99 \log x$  .

The determination coefficients of above equations are respectively 0 . 94 , 0 . 98 and 0 . 98 at 1% level . Regression paired comparing for key and reference area showed that t-calculated ( 0 . 53 ) was smaller than t-table . Therefore there was not a significant difference between these two areas . The t-calculated value was bigger than t-table in reference and critical areas and in key and critical areas . These results show that both key and critical areas are susceptible to species number changes . Figure 1 , 2 and 3 show regression equations and lines at key , reference and critical areas .

**Discussion** Key and reference areas were not different . We assumed then that moderate grazing had the same effects as no grazing on species richness . This result is similar to those obtained by Mesdaghi ( 1980 ) . With heavy grazing ( critical area ) there was an obvious reduction of species richness which can be serious risk for rangeland . Utilization based on a key area in each management level is the best approach for rangeland protection and conservation .

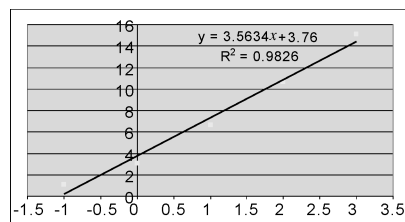


Figure 1 Regression equation of key area .

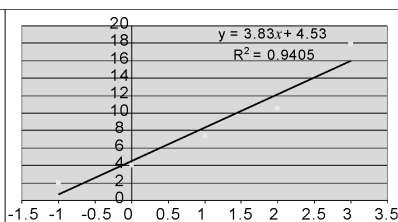


Figure 2 Regression equation of reference area .

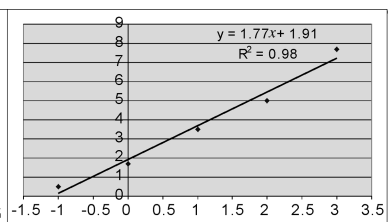


Figure 3 Regression equation of critical area .

### References

- Cingolani , A . M . , I . Noy-Meir and S . Diaz , ( 2005 ) . Grazing effects on rangeland diversity . A Synthesis of Contemporary Models , *Ecological Applications* , 15 ( 2005 ) , pp . 757-773 .  
Mesdaghi , M . , ( 1980 ) , Species richness and life form in triple levels rangeland utilization ( In Persian ) , *Iranian Natura Resources and Agriculture Journal* , 7 ( 3 ) : 2-9 .  
Naveh , Z . and R . H . Whittaker , ( 1979 ) . Measurements and relationships of plant species diversity in Mediterranean shrub lands and woodlands . Ecological diversity in theory and practice . Statistical ecology theories Vol . 6 . Edited by J . F . Grassle , G . P . Patil , W . K . Smith and C . Tailie . International Co-operative Publishing House . pp . 219-239 .