



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

Application of Analytical Hierarchy Process (AHP) in Priority Classification of Utilization Measurement Methods in *Agropyron trichophrum* Stands in Upland Grasslands of Iran

Fazel Amiri
Islamic Azad University, Iran

Follow this and additional works at: <https://uknowledge.uky.edu/igc>



Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/1-4/35>

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Application of Analytical Hierarchy Process (AHP) in priority classification of utilization measurement methods in *Agropyron trichophrum* stands in upland grasslands of Iran

Fazel Amiri

Faculty Member of Islamic Azad University Busheher Branch, Iran. E-mail: amiri_fazei@yahoo.com, Taybeh, Tabatabaei, MS.c Student of Environmental Pollution, Islamic Azad University Research and Sciences Branch, Ahwaz.

Key words : measurement methods, percent utilization, Analytical Hierarchy Process

Introduction Determination of optimum utilization rate for different range species is an important factor in range grazing capacity measurement. The vast rangelands in Iran with diverse vegetation types require an accurate, economic and quick method to determine the optimum utilization rate for different range species. This experiment was conducted to determine the most appropriate method to determine the optimum utilization rate for *Agropyron trichophrum*, which is considered as one of important grass species in upland grasslands in Iran.

Materials and methods The measurement methods were classified in three categories according to sampling sizes and then for each method the number of samples was determined using the appropriate statistical procedures (Bonham, 1989). The time consumption (in field and laboratory) as well as expenses (equipments and labor) for each sample was measured in each method. To determine the accuracy of the applied methods, the statistical method of Estimating Sampling Sizes was employed (Cook et al., 1986). The collected data were analyzed by AHP statistical method using "Expert Choice" software (Asgharpoor, 1998).

Results Stem counting was the quickest and most economic method while paired caging (control) method appeared to be the most expensive and time consuming one (Table 1). There was a significant difference ($P < 0.05$) in mean utilization rate of *Agropyron trichophrum* measured between paired caging method (control) and other methods except for height-weight, before and after grazing and Occular (double sample) estimation methods. The accuracy test showed that height-weight, before and after grazing, Occular (double sample) estimation and paired caging (control) methods with 4.5, 8.3 and 8.6 percent estimation faults (k), respectively, were the most reliable methods among the others. The results of this experiment in respect to high expenses and time consumption of paired caging (control) method corresponds to results reported by Klingman et al. (1943). Stem counting method appeared to be economic and quick in this experiment, however, it was not accurate and trustable which supports the results reported by Pechanec et al. (1937).

Table 1

| Methods | Percentage utilization | Time(min) | Budget | Percent estimation faults (k%) | AHP |
|----------------------------------|------------------------|-----------|--------|--------------------------------|---------|
| Paired cage (control) | 42.8a | 1258 | 129890 | — | 0.073b |
| Before and after grazing | 41.87a | 938 | 114890 | 3.7 | 0.046b |
| Occular estimate (double sample) | 48.77a | 66 | 35138 | 5 | 0.104b |
| Height-weight | 45a | 290 | 29964 | 0.8 | 0.154b |
| Stem count | 30.45b | 52 | 11506 | 11.4 | 0.186a |
| Reference unite | 27.2bc | 275 | 33080 | 6.9 | 0.089c |
| Production index | 20.41dc | 345 | 41075 | 13.9 | 0.073dc |
| Plant count | 17.21d | 189 | 24420 | 18.8 | 0.023d |
| Twig length | 13.12d | 582 | 62917 | 20.5 | 0.041d |

Means with the same letter are not significantly different at 5% level.

Conclusions The results obtained by Analytical Hierarchy Process in this experiment showed that the appropriate method (quickest, most economic and most accurate) to measure the optimum utilization rate of *Agropyron trichophrum* in upland grasslands of Iran is height-weight method.

References

- Asgharpoor, M., (1998). Multi Criteria Decision Making. Publication of Tehran University.
- Bonham, C. D., (1989). Measurements for terrestrial vegetation. John Wiley and Sons, Inc., New York.
- Cook, C. W. and W. Stubbendieck 1986. Range Research: Basic Problems and Techniques published by Society of Range Management, USA.
- Pechanec, J. F. and G. D. Pickford. (1937). A comparison of some methods used in determining percentage utilization of range grasses. J. Agr. Res. Vol. 54. pp. 753-765.
- Klingman, D. S. R. Miles & G. O. Mott. (1943). The cage method for determining consumption and yield of pasture herbage. Jour. Am. Soc. Agron. Vol. 35. No. 9. pp. 739-746.