



## Scholars Research Library

Annals of Biological Research, 2011, 2 (3) :188-193  
(<http://scholarsresearchlibrary.com/archive.html>)



ISSN 0976-1233  
CODEN (USA): ABRNBW

### Average stem biomass of *Herniaria incana* in Shanjan Rangelands, East Azerbaijan, Iran

Ghassem Habibi Bibalani

Department of Agriculture, Shabestar Branch, Islamic Azad University, Shabestar, Iran

---

#### ABSTRACT

*Plants can be used for animal grazing, in wind erosion control, to reduce water flow rates, and to increase evaporation and transpiration. In the NW of Iran (East Azerbaijan Province), rangelands previously used to animal grazing were changed to agricultural land use; this vegetation is unsuitable vegetation coverage. We studied HERNIARIA INCANA to determine its stem biomass characteristics. Data were collected using an accidental sampling methodology (1\*1 m). In total, 6 plots were identify and 30 samples were collected for this research. In the minimum, maximum and mean stem biomass for this plant were found to me 2, 8 and 3 g, respectively.*

**Key word:** HERNIARIA INCANA , Iran, Rangeland, stem Biomass.

---

#### INTRODUCTION

Rangeland ecosystem stabilizing, optimum and continual utilization of the range without studding and knowing the influencing factors on its segments and animal pasturage are of special importance [12, 13, 23, 28, 29]. There are different methods of evaluating rangelands and all of them have advantages and disadvantages. Factors such as vegetation species composition, annual production, area coverage, plant density, soil surface coverage, constitution, and presence of succulence plants were used [14, 22] but estimation of these parameters are time consuming and expensive.

Fresquez [17] reported an increase in vegetative production and forage quality of Blue Grama [20]. Benton & Wester [4] reported an increase in Tobosagrass (*Hilaria mutica*) yield following applications of biosolids at levels of 7, 18, and 34 dry Mg ha<sup>-1</sup> in the Chihuahuan Desert. Although dormant season applications of biosolids seem to be more beneficial for plant growth than growing season applications during the year of biosolids application [4], explanations for this phenomenon have not been documented [20].

Most evidence is related to its negative effect on aboveground vegetative and reproductive plant biomass [19, 21], changes in the spatial patterning of plant canopies and soil resources [1, 7, 16, 27], the reduction of soil seed banks [5, 6], the decrease in the availability of safe micro sites for plant reestablishment [15, 24], and the invasion of woody plants [21, 26, 27]. Aboveground defoliation can modify the partitioning of assimilates between belowground and aboveground organs and consequently the root growth of defoliated plants [3, 25, 26, 30]. In this research we have studied the amount of above ground biomass and occurrence of *HERNIARIA INCANA* [18] (Figure 1) at the rangeland area of Shanjan village, Shabestar district, NW Iran. This parameter needs more attention, but it is one of the determining Factors of rangeland ecosystem.

## MATERIALS AND METHODS

The research area is part of Shanjan rangeland in Shabestar district with distance about 5 Kilometers from Shabestar city. The terrain in this area is hilly and we carried out the study on a site with a northerly aspect [12, 13] (Figure 1). This region is component of Iran-Turan Flora with elevation between 1700-1850 m [13].



**Figure 1: Part of Shanjan rangeland in Shabestar district, East Azerbaijan province, Iran.**

*Herniaria* is a genus of flowering plants in the pink family known generally as ruptureworts. They are native to Eurasia and Africa but several species have been widely introduced to other continents. These are flat, mat-forming annual herbs. The genus gets its scientific and common names from the once-held belief that species could be used as an herbal remedy for hernias [32]. *Herniaria incana* (Table 1, figure 2) is one of species of this genus that have been studied in this research.





Figure 2. *HERNIARIA INCANA* species

Table 1: Scientific name for *HERNIARIA INCANA* Classification Report [31].

Kingdom	<i>Plantae</i> – Plants
Subkingdom	<i>Tracheobionta</i> – Vascular plants
Superdivision	<i>Spermatophyta</i> – Seed plants
Division	<i>Magnoliophyta</i> – Flowering plants
Class	<i>Magnoliopsida</i> – Dicotyledons
Subclass	<i>Caryophyllidae</i>
Order	<i>Caryophyllales</i>
Family	<i>Caryophyllaceae</i> – Pink family
Genus	<i>Herniaria</i> L. – rupturewort
Species	<i>Herniaria incana</i> Lam. – gray rupturewort

In this research, Stem biomass has been sampled in May and June, 2010. For sampling, we used an accidental sampling methodology (1\*1 m plot) in this research and selected 30 (6 plots with 5 sub sample for each of them) samples in total [33] (Figure 3).

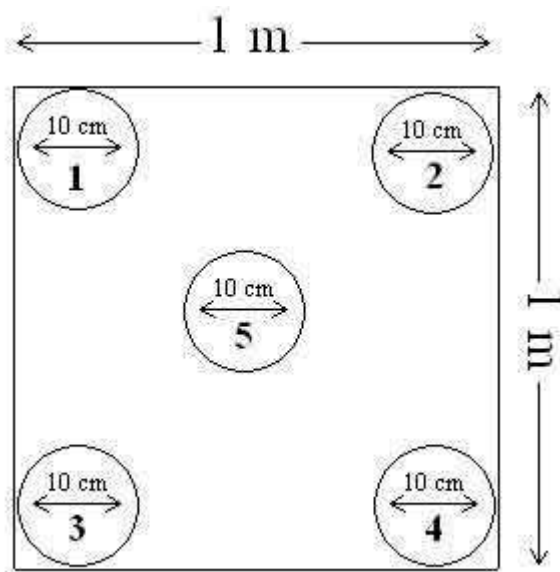


Figure 3. Sampling design in 1\*1 m plot [33]. 1, 2, 3, 4 and 5 is sub sample in each main sample..

After sapling from studding area, they have been scaled fresh weight of above ground part of plant with sensitive scale then dried by Avon set in 80° c during 24 hours [33] and scaled dried weight separately. This study have been work in Shanjan rangeland at Shabestar district in East Azerbaijan, Iran in summer 2010.

## RESULTS

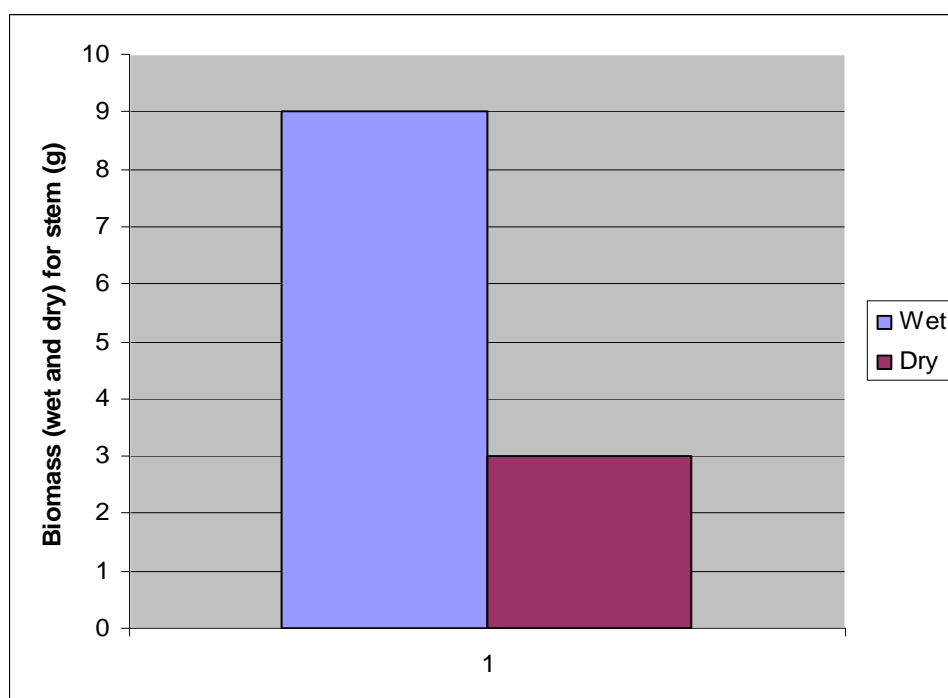


Figure 4. *HERNIARIA INCANA* stem weight (fresh and dried weight).



Stem height *HERNIARIA INCANA* was unsteady from 30 to 90 mm, that average of it is about 50 mm.

Results from this study showed that the maximum, minimum and medium stem biomass of *HERNIARIA INCANA* in the study area were 2, 8 and 3 g, respectively (Figure 4).

### CONCLUSION

In total of 6 plots were identified and 30 samples were studied in this research work. From 30 samples about 66.66% of stem weight was lost when samples were dried.

Vegetation species can have an effect on soil chemical and physical properties [2]. Increasing *HERNIARIA INCANA* species in the study area could cause specific biological qualification, and as this species increasing density of above ground Biomass will increase, and also the amount of Soil protection and stabling will increase specially protection with wind erosion and soil lost with runoff [12, 13, 28, 29]. Study on this plant over ground biomass is so much important information especially for medicinal plant. Joudi and Bibalani [11] have been studied and recognized some medicinal plant of Ilkhji region, Eastern Azerbaijan Province (Northwestern Iran).

In this study we examined the biomass of this plant and results suggest that changes in the above ground cover of this plant affect by grazing or soil compaction with animal at this area as found in other studies [8-13, 26, 28, 29] and The difference of wet weight and biomass of this plant would be expected in this area [8-13, 28, 29].

This study has revealed and quantified the stem biomass of the *HERNIARIA INCANA* in the Shanjan rangelands, the plant has good biomass in this research area and probably also in other areas where the *HERNIARIA INCANA* is growing that need studding separately in another areas. It is a pioneer study, and the results have given estimations of the stem biomass of the *HERNIARIA INCANA* for the first time in Shanjan rangeland. It is needed for studying this and other shrub species in the area and could be used in identifying plants best suited for rangeland ecosystem stability and specifically for stabilizing surface soil layers especially from water and wind erosion.

### Acknowledgement

The authors greatly acknowledge the scientific support from the Islamic Azad University-Shabestar Branch, to the first author in this study. This paper is a part of a project entitled "Study on Root development forbs and shrubs on Shanjan Range of the Shabestar area, and their effects on soil surface and subsurface erosion" with project number **51955880630001**. The authors also express their sincere appreciation to the anonymous reviewer(s) for their help to improve the paper quality.

### REFERENCES

- [1] Adler, P.B., Raff, D.A., Lauenroth, W.K., *Oecologia* **2001** 128: 465–479.
- [2] Ardekani, M., Book of Ecology, University Tehran press, Tehran, **2003** Vol. pp.340
- [3] Belsky, A.J., *American Naturalist* **1986** 127 (6): 870–892.
- [4] Benton, M.W., Wester, D.B., *Journal of Environmental Quality* **1998** 27: 199–208.
- [5] Bertiller, M.B., *Environmental Management* **1996** 20: 123–132.
- [6] Bertiller, M.B., *Seed Science Research* **1998** 8: 39–45.

- [7] Bertiller, M.B., Coronato, F., *Biological Conservation* **1994** 3: 57–67.
- [8] Bibalani, G.H., *International Journal of Academic Research* **2011** 3 (1): 705-707.
- [9] Bibalani, G.H., *International Journal of Academic Research* **2011** 3 (1): 708-710.
- [10] Bibalani, G.H., *International Journal of Academic Research* **2011** 3 (1): 122-124.
- [11] Bibalani, G.H., Joudi, L., Shadkami-til, H., *Research Journal of Biological Sciences* **2010** 5 (6): 444-447.
- [12] Bibalani, G.H., Joudi, L., Shadkami-til, H., *Annals of biological research* **2011** 2 (1): 231-236.
- [13] Bibalani, G.H., Joudi, L., Shadkami-til, H., *Annals of biological research* **2011** 2 (1): 237-240.
- [14] Bidlock, E.J., Voughan, J.E., Devald, C.L., *Journal of Range Management* **1999** 52: 661- 665.
- [15] Bisigato, A.J., Dinamica of vegetacion a reas en extremo austral de pastoreadas of the provincial of the Monte phytogeographic, **2000**.
- [16] Callaway, R.M., *Botanical Review* **1995** 61: 306–349.
- [17] Fresquez, P.R., Francis, R.E., Dennis, G.L., *Journal of Range Management* **1990** 43: 325–331.
- [18] Gharaman, A., Folor Colored Iran, Froest and rangland reserch Organization, Tehran, **2003** Vol. 1-24 pp
- [19] Hutchings, M.J., John, E.A., Distribution of roots in soil, and root foraging activity. In: de Kroon, H., Visser, E.J.W. (Eds.), *Ecological Studies*, Ecological Studies **2003**: 33–60.
- [20] Mata-Gonza'lez, R., Ronald, E.S., Changgui, W., *Journal of Arid Environments* **2002** 50: 477–488.
- [21] Milchunas, D.G., Lauenroth, W.K., *Ecological Monographs* **1993** 63 (4): 327–366.
- [22] Mogaaddam, M.R., Ecology descriptive and Astistic Vegetal Coverage, Tehran University, Tehran, **2001** Vol. pp.258
- [23] Mozaffarian, V., A Dicionary of Iranian, Latin, English, Persian, Farhang Moaser, Tehran, **2007** Vol. pp
- [24] Oesterheld, M., Sala, O.E., *Journal of Vegetation Science* **1990** 1: 353–358.
- [25] Richards, J.H., Caldwell, M.M., *Journal of Applied Ecology* **1985** 22: 907–920.
- [26] Rodriguez, M.V., Bertiller, M.B., Sain, C.L., *Journal of Arid Environments* **2007** 70: 137–151.
- [27] Schlesinger, W.H., Reynolds, J.F., Cunningham, G.L., Huennke, L.F., Jarrel, W.M., Virginia, R.A., Withford, W.G., *Science* **1990** 247: 1043–1048.
- [28] Shadkami-Til, H., Bibalani, G.H., *International Journal of Academic Research* **2010** 2 (6): 110-113.
- [29] Shadkami-Til, H., Bibalani, G.H., *International Journal of Academic Research* **2011** 3 (1): 698-701.
- [30] Snyder, K.A., Williams, D.G., *Functional Ecology* **2003** 17: 363–374.
- [31] USDA, , *Herniaria incana* Lam., <http://plants.usda.gov/java/nameSearch>, Retrieved 15, April. 2011, **2011**.
- [32] wikipedia, , *Herniaria*, <http://en.wikipedia.org/wiki/Herniaria>, Retrieved 15, April. 2011, **2011**.
- [33] Xiaoyan, P., Zhou, G., Zhuang, Q., Wang, Y., Zuo, W., Shi, G., Lin, X., Wang, Y., *Geoderma* **2001** 155: 262–268.