

Average stem biomass of ONOBRYCHIS MELANOTRICHA in Shanjan Rangelands, East Azerbaijan, Iran

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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 ONOBRYCHIS MELANOTRICHA to determine its stem biomass characteristics. Data were collected using an accidental sampling methodology (1*1 m). In total, 4 plots were identify and 20 samples were collected for this research. In the minimum, maximum and mean stem biomass for this plant were found to me 2.1, 6.5 and 3 g, respectively.

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Key word: ONOBRYCHIS MELANOTRICHA , Iran, Rangeland, stem Biomass.

1. 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 (Bibalani et al., 2011a;Bibalani et al., 2011b;Mozaffarian, 2007;Shadkami-Til and Bibalani, 2010;Shadkami-Til and Bibalani, 2011). 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 (Bidlock et al., 1999;Mogaaddam, 2001) but estimation of these parameters are time consuming and expensive.

Fresquez (Fresquez et al., 1990) reported an increase in vegetative production and forage quality of Blue Grama (Mata-Gonza'lez et al., 2002). Benton & Wester (Benton and Wester, 1998) reported an increase in Tobosagrass (*Hilaria mutica*) yield following applications of biosolids at levels of 7, 18, and 34 dry Mg ha⁻¹ 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 (Benton and Wester, 1998), explanations for this phenomenon have not been documented (Mata-Gonza'lez et al., 2002).

Most evidence is related to its negative effect on aboveground vegetative and reproductive plant biomass (Hutchings and John, 2003;Milchunas and Lauenroth, 1993), changes in the spatial patterning of plant canopies and soil resources (Adler et al., 2001;Bertiller and Coronato, 1994;Callaway, 1995;Schlesinger et al., 1990), the reduction of soil

seed banks (Bertiller, 1996;Bertiller, 1998), the decrease in the availability of safe micro sites for plant reestablishment (Bisigato, 2000;Oesterheld and Sala, 1990), and the invasion of woody plants (Milchunas and Lauenroth, 1993;Rodriguez et al., 2007;Schlesinger et al., 1990).

Aboveground defoliation can modify the partitioning of assimilates between belowground and aboveground organs and consequently the root growth of defoliated plants (Belsky, 1986;Richards and Caldwell, 1985;Rodriguez et al., 2007;Snyder and Williams, 203).

In this research we have studied the amount of above ground biomass and occurrence of ONOBRYCHIS MELANOTRICHA (Gharaman, 2003) (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.

2. 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 (Bibalani et al., 2011a;Bibalani et al., 2011b) (Figure 1). This region is component of Iran-Turan Flora with elevation between 1700-1850 m (Bibalani et al., 2011b).

Onobrychis, the Sainfoins, are Eurasian perennial herbs of the legume family (Fabaceae). Including doubtfully distinct species and provisionally accepted taxa, about 150 species are presently known. The Flora Europaea lists 23 species of Onobrychis; the main centre of diversity extends from Central Asia to Iran, with 56 species – 27 of which are endemic – in

the latter country alone (Wikipedia, 2011). *Onobrychis melanotricha* (Table 1, figure 2) (Fabaceae) is an endemic perennial herb in Iran and has two varieties (Karamian et al, 2010).



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

Table 1: Scientific name for *ONOBRYCHIS MELANOTRICHIA* Classification Report (USDA, 2011).

Kingdom	Plantae – Plants
Subkingdom	Tracheobionta – Vascular plants
Superdivision	Spermatophyta – Seed plants
Division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons
Subclass	Rosidae
Order	Fabales
Family	Fabaceae – Pea family
Genus	<i>Onobrychis</i> Mill. – sainfoin
Species	<i>Onobrychis melanotricha</i> Boiss.

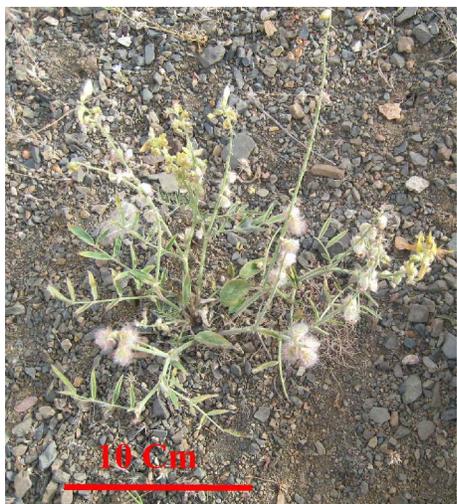


Figure 2. *ONOBRYCHIS MELANOTRICHIA* species

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 20 (4 plots with 5 sub sample for each of them) samples in total (Xiaoyan et al., 2001) (Figure 3).

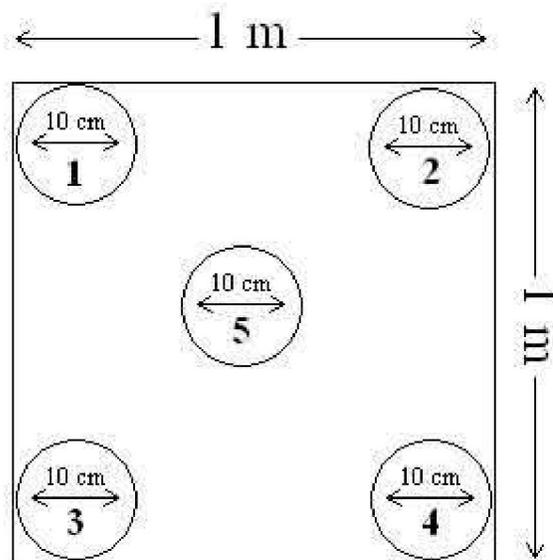


Figure 3. Sampling design in 1*1 m plot (Xiaoyan et al., 2001). 1, 2, 3, 4 and 5 is sub sample in each main sample.

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 (Xiaoyan et al., 2001) and scaled dried weight separately. This study have been work in Shanjan rangeland at Shabestar district in East Azerbaijan, Iran in summer 2010.

3. RESULTS

Results from this study showed that the maximum, minimum and medium stem biomass of *ONOBRYCHIS MELANOTRICHIA* in the study area were 2.1, 6.5 and 3 g, respectively (Figure 4).

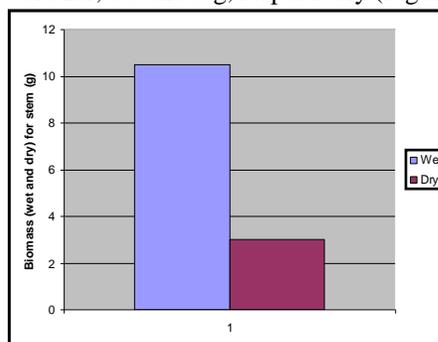


Figure 4. *ONOBRYCHIS MELANOTRICHIA* stem weight (fresh and dried weight).

Stem height ONOBRYCHIS MELANOTRICHA was unsteady from 50 to 200 mm, that average of it is about 120 mm.

4. Conclusion

In total of 4 plots were identified and 20 samples were studied in this research work. From 20 samples about 71.43% of stem weight was lost when samples were dried.

Vegetation species can have an effect on soil chemical and physical properties (Ardekani, 2003). Increasing ONOBRYCHIS MELANOTRICHA 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 (Bibalani et al., 2011a; Bibalani et al., 2011b; Shadkami-Til and Bibalani, 2010; Shadkami-Til and Bibalani, 2011). Study on this plant over ground biomass is so much important information especially for medicinal plant. Joudi and Bibalani (Bibalani et al., 2010) 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 (Bibalani, 2011a; Bibalani, 2011b; Bibalani, 2011c; Bibalani et al., 2010; Bibalani et al., 2011a; Bibalani et al., 2011b; Rodriguez et al., 2007; Shadkami-Til and Bibalani, 2010; Shadkami-Til and Bibalani, 2011) and The difference of wet weight and biomass of this plant would be expected in this area (Bibalani, 2011a; Bibalani, 2011b; Bibalani, 2011c; Bibalani et al., 2010; Bibalani et al., 2011a; Bibalani et al., 2011b; Shadkami-Til and Bibalani, 2010; Shadkami-Til and Bibalani, 2011).

This study has revealed and quantified the stem biomass of the ONOBRYCHIS MELANOTRICHA in the Shanjan rangelands, the plant has good biomass in this research area and probably also in other areas where the ONOBRYCHIS MELANOTRICHA 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 ONOBRYCHIS MELANOTRICHA 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.

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REFERENCE

1. Adler P B, Raff D A, and Lauenroth W K (2001). The effect of grazing on the spatial heterogeneity of vegetation *Oecologia* 128: 465–479.
2. Ardekani M (2003). Ecology, University Tehran, Tehran.340
3. Belsky A J (1986). Does herbivory benefit plants? A review of the evidence *American Naturalist* 127 (6): 870–892.
4. Benton M W, and Wester D B (1998). Biosolids effects on tobosagrass and alkali sacaton in a Chihuahuan desert grassland *Journal of Environmental Quality* 27: 199–208.
5. Bertiller M B (1996). Grazing effects on sustainable semiarid rangelands in Patagonia: the state and dynamics of the soil seed bank *Environmental Management* 20: 123–132.
6. Bertiller M B (1998). Spatial patterns of the germinable soil seed bank in northern Patagonia *Seed Science Research* 8: 39–45.
7. Bertiller M B, and Coronato F (1994). Seed bank patterns of *Festuca pallescens* in semiarid Patagonia (Argentina): a possible limit to bunch reestablishment *Biological Conservation* 3: 57–67.
8. Bibalani G H (2011a). Investigation on Persian Orange root growth in first tree years *International Journal of Academic Research* 3 (1): 705.
9. Bibalani G H (2011b). Investigation on *Prunus avium* root growth in first tree years *International Journal of Academic Research* 3 (1): 708.
10. Bibalani G H (2011c). Investigation on *Pyrus* Sp. root growth in first tree years *International Journal of Academic Research* 3 (1): 122.
11. Bibalani G H, Joudi L, and Shadkami-til H (2010). Average Stem Biomass of *Lappula microcarpa* in Shanjan Rangelands, East Azerbaijan, Iran *Research Journal of Biological Sciences* 5 (6): 444.

12. Bibalani G H, Joudi L, and Shadkami-til H (2011a). Average stem biomass of *Paronychia kurdica* Boiss in Shanjan Rangelands, East Azerbaijan, Iran *Annals of biological research* 2 (1): 231.
13. Bibalani G H, Joudi L, and Shadkami-til H (2011b). Research of Root Biomass of *Lappula microcarpa* in Shanjan Rangelands, East Azerbaijan, Iran *Annals of biological research* 2 (1): 237.
14. Bidlock E J, Voughan J E, and Devald C L (1999). Forage Quality of 10 Eastern Gama Grass *Jornal of Range Management* 52: 661.
15. Bisigato A J (2000). *Dinamica de la vegetacion en a reas pastoreadas del extremo austral de la provincial fitogeografica del Monte* Ph.D. Pp 163
16. Callaway R M (1995). Positive interactions among plants *Botanical Review* 61: 306–349.
17. Fresquez P R, Francis R E, and Dennis G L (1990). Soil and vegetation responses to sewage sludge on a degraded semiarid broom snakeweed/blue grama plant community *Journal of Range Management* 43: 325–331.
18. Gharaman A (2003). *Folor Colored Iran*, Froest and rangland reserch Organization, Tehran
19. Hutchings M J, and John E A (2003). Distribution of roots in soil, and root foraging activity. In: de Kroon, H., Visser, E.J.W. (Eds.), *Ecological Studies Ecological Studies*: 33–60.
20. Karamian R, Moradi Behjou A, Atri M, Ranjbar M (2010). INFRASPECIFIC VARIATION OF *ONOBRYCHIS MELANOTRICHA* BOISS. (FABACEAE) IN RELATION TO ITS HABITATS IN HAMEDAN PROVINCE, IRAN. *Iranan Journal Of Botany* 16 (1): 10-21.
21. Mata-González R, Ronald E S, and Changgui W (2002). Shoot and root biomass of desert grasses as affected by biosolids application *Journal of Arid Environments* 50: 477–488.
22. Milchunas D G, and Lauenroth W K (1993). Quantitative effects of grazing on vegetation and soils over a global range of environments *Ecological Monographs* 63 (4): 327–366.
23. Mogaaddam M R (2001). *Ecology descriptive and Astistic Vegetal Coverage*, Tehran University, Tehran.258
24. Mozaffarian V (2007). *A Dicionary of Iranian, Latin, English, Persian, Farhang Moaser*, Tehran
25. Oosterheld M, and Sala O E (1990). Effects of grazing on seedling establishment: the role of seed and safe-site availability *Journal of Vegetation Science* 1: 353–358.
26. Richards J H, and Caldwell M M (1985). Soluble carbohydrates, concurrent photosynthesis and efficiency in regrowth following defoliation: a field study with *Agropyron* species *Journal of Applied Ecology* 22: 907–920.
27. Rodriguez M V, Bertiller M B, and Sain C L (2007). Spatial patterns and chemical characteristics of root biomass in ecosystems of the Patagonian Monte disturbed by grazing *Journal of Arid Environments* 70: 137–151.
28. Schlesinger W H, Reynolds J F, Cunningham G L, Huenneke L F, Jarrel W M, Virginia R A, and Withford W G (1990). Biological feedback in global desertification *Science* 247: 1043–1048.
29. Shadkami-Til H, and Bibalani G H (2010). Under-over ground Biomass characterics of perennial Species (*Teucruim polium*) in northwest Iran (Till area of Shabestar) *International Journal of Academic Research* 2 (6): 110.
30. Shadkami-Til H, and Bibalani G H (2011). Over ground Biomass characterics of Genera single Species Iran (*Cnicus benedictus*) In northwest Iran (Till area of shabestar) *International Journal of Academic Research* 3 (1): 698.
31. Snyder K A, and Williams D G (2003). Defoliation alters water uptake by deep and shallow roots of *Prosopis velutina* (Velvet mesquite) *Functional Ecology* 17: 363–374.
32. USDA, 2011, *Onobrychis melanotricha* Boiss., <http://plants.usda.gov/java/nameSearch>, Retrieved 16, April. 2011.
33. wikipedia, 2011, *Onobrychis*, <http://en.wikipedia.org/wiki/Onobrychis>, Retrieved 16, April. 2011.
34. Xiaoyan P, Zhou G, Zhuang Q, Wang Y, Zuo W, Shi G, Lin X, and Wang Y (2001). Effects of sample size and position from monolith and core methods on the estimation of total root biomass in a temperate grassland ecosystem in Inner Mongolia *Geoderma* 155: 262–268.

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