

*Full Length Research Paper*

# Average stem biomass of *Astragalus obnormalis* in Shanjan rangelands, East Azerbaijan, Iran

Ghassem Habibi Bibalani\*, Leila Joudi and Hamideh Shadkami-Til

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

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**Stem of plants can be used as animal grazing, wind erosion control, reduce water flow, increase evaporation and transpiration. In NW of Iran (East Azerbaijan Province), rangelands was utilized with animal grazing and changed to agricultural land use; this vegetation is unsuitable vegetation coverage. We studied *Astragalus obnormalis* to determine its stem biomass characteristics. Data were collected with accidental sampling method (1\*1 m) in this area. In total of 11 plots were collected and 55 samples were studied in this research. Minimum, maximum and mean stem biomasses of this plant were 1.2, 7.7 and 4.7 g, respectively.**

**Key words:** *Astragalus obnormalis*, Iran, rangeland, stem biomass.

## INTRODUCTION

Rangeland ecosystem stabling, optimum and continuum utilization of range without studding and knowing effective factors on its segments and animal pasturage have special importance (Mozaffarian, 2007; Shadkami-Til and Bibalani, 2010, 2011). There are different methods for evaluating range position, that all of them have special advantages and disadvantages and each of them have different factors such as species composition percentage, production, coverage, density, Soil position (soil surface coverage and erosion), cadaver, birthing, constitution, and succulence plants were used (Bidlock et al., 1999; Mogaaddam, 2001) but estimation of these parameters are time consuming and expensive.

Fresquez et al. (1990) reported an increase in vegetative production and forage quality of blue grama (*Bouteloua gracilis* (H.B.K.) Lag. ex Steud.) (Mata-González et al., 2002). Benton and Wester (1998) reported an increase in tobosagrass (*Hilaria mutica* (Buckl.) Benth) 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 (Benton and Wester, 1998), explanations for this phenomenon have not been documented (Mata-González 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; Mazzarino et al., 1998; Schlesinger et al., 1996), the reduction of soil seed banks (Bertiller, 1996, 1998; Mayor et al., 2003), the decrease in the availability of safe microsites for plant reestablishment (Bisigato, 2000; Oesterheld and Sala, 1990), and the invasion of woody plants (Milchunas and Lauenroth, 1993; Schlesinger et al., 1990; Rodriguez et al., 2007). 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; Snyder and Williams, 2003; Rodriguez et al., 2007).

In this research we have studied the amount of over ground Biomass and *Astragalus obnormalis* Species (Gharaman, 2003) (Figure 1) at rangeland area of Shanjan village, Shabestar District, NW Iran. This parameter needs more attention, but it is one of the determined factors of rangeland ecosystem stabling in that place.

## MATERIALS AND METHODS

Research area is part of Shanjan rangeland from Shabestar distract with distance about 5 km from it. The study area is located into a hill

\*Corresponding author. E-mail: [habibibibalani@gmail.com](mailto:habibibibalani@gmail.com).



**Figure 1.** A part of Shanjan rangeland from Shabestar district, East Azerbaijan province, Iran.

**Table 1.** Scientific name for astragalus classification report (USDA, 2011).

Kingdom	<i>Plantae – Plants</i>
Subkingdom	<i>Tracheobionta – Vascular plants</i>
Superdivision	<i>Spermatophyta – Seed plants</i>
Division	<i>Magnoliophyta – Flowering plants</i>
Class	<i>Magnoliopsida – Dicotyledons</i>
Subclass	<i>Rosidae</i>
Order	<i>Fabales</i>
Family	<i>Fabaceae – Pea family</i>
Genus	<i>Astragalus L. – milkvetch</i>

and range of Misho Mountain with N aspect (Salimi, 2003) (Figure 1). This region is component of Iran-Turan Flora with elevation between 1700 to 1850 m (Pabot and Beck, 1990). *A. obnormalis* is a species of *Astragalus* genus (Table 1 and Figure 2). *Astragalus* is a large genus of about 2,000 species of herbs and small shrubs, belonging to the legume family Fabaceae (Wikipedia, 2011).

In this research, stem biomass has been sampled in May and June, 2010. We used accidental sampling method (1\*1 m plot) in this research and select 11 \*5=55 (11 plots with 5 sub sample for each of them) samples totally (Ping et al., 2010) (Figure 3). After sampling from studding area, they have been scaled fresh weight of over ground part of plant with sensitive scale then dried by Avon set in 80°C during 24 h (Ping et al., 2010) and scaled dried weight separately.

## RESULTS

Results of this study have been showed that the maximum, minimum and medium stem Biomass of *A. obnormalis* in studding area were 1.2, 7.7 and 4.7 g, respectively (Figure 4). Stem height *A. obnormalis* was unsteady from 50 to 150 mm, that average of it is about

80 mm.

## Conclusion

In total of 11 plots were collected and 55 samples were studied in this research. In total of 55 samples of about 65.4% of stem weight have been losses when samples dried. Vegetal species can have effect on soil chemical and physical properties (Ardekani, 2003). Increasing *A. obnormalis* species in studying area can cause specific biological qualification, and as this species increase density of over ground biomass will increase, and also the amount of soil protection and stabling will increase specially protection with wind erosion and soil losing with runoff (Shadkami-Til and Bibalani, 2010, 2011).

This study has revealed and quantified the stem biomass of the *A. obnormalis* in the Shanjan rangelands, the plant has good biomass in this research area and probably also in other areas where the *A. obnormalis* is growing that need studding separately in another areas. It

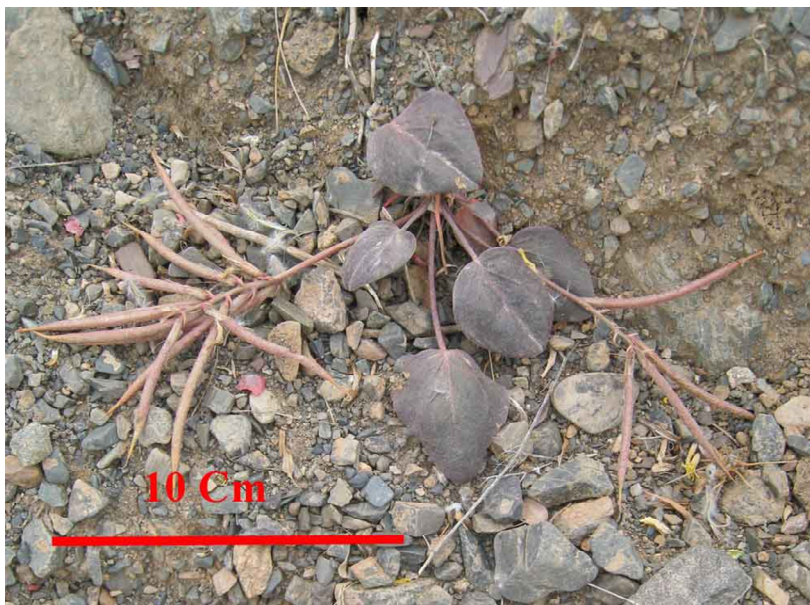


Figure 2. *Astragalus obnormalis* species.

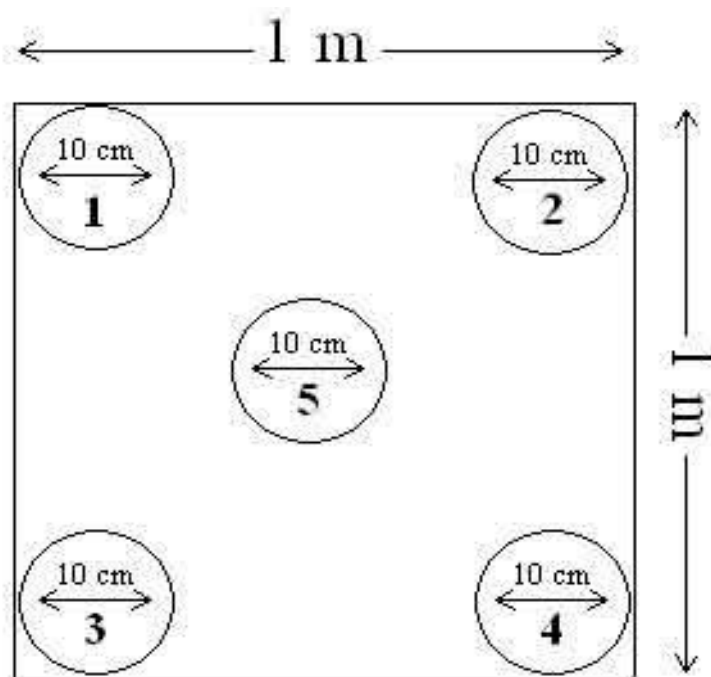


Figure 3. Sampling design in 1\*1 m plot (Ping et al., 2010).

is a pioneer study, and the results have given estimations of the stem biomass of the *A. obnormalis* for the first time in Shanjan rangeland. There is need for studding, such as this for all shrubs and plant in this area and another place for recognizing the best plant for rangeland ecosystem stabling and stabilizing surface soil erosion specially wind erosion.

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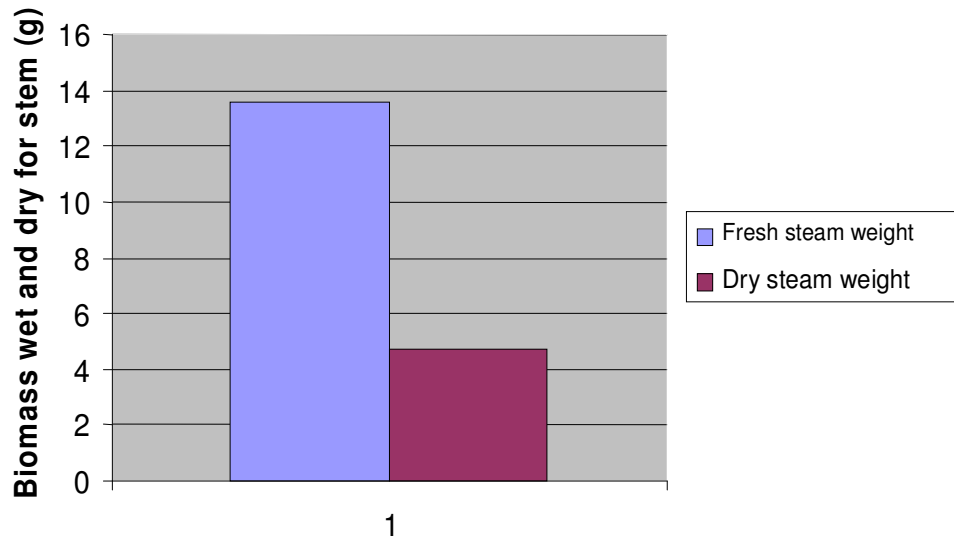


Figure 4. *A. obnormalis* stem weight (fresh and dried weight).

on root development forbs and shrubs on Shanjan Range of Shabestar area and the effect of them on soil surface and subsurface erosion control" with project number 51955880630001 that have been worked on in 2010. The authors also express their sincere appreciation to the anonymous reviewer(s) for their help in improving paper quality.

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