Journal of Medicinal Plants Research Vol. 5(29), pp. 6491-6495, 9 December, 2011
Available online at http://www.academicjournals.org/JMPR
ISSN 1996-0875 ©2011 Academic Journals
DOI: 10.5897/JMPR11.304

Full Length Research Paper

Average stem biomass of *Prangos cheilanthifolia* as a medicinal plant in Shanjan Rangelands, East Azerbaijan, Iran

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Accepted 21 October, 2011

Plants can be used for animal grazing, in wind erosion control, to reduce water flow rates, and to increase evaporation and transpiration. In the Northwest (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 *Prangos cheilanthifolia* 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 be 2.1, 5.2 and 3.5 g, respectively.

Key words: *Prangos cheilanthifolia*, 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 (Bibalani et al., 2011a, b; 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 et al. (1990) reported an increase in vegetative production and forage quality of Blue Grama (Mata-Gonza´lez et al., 2002). 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 above ground 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).

Above ground defoliation can modify the partitioning of assimilates between belowground and above ground organs and consequently the root growth of defoliated plants (Belsky, 1986; Richards and Caldwell, 1985; Rodriguez et al., 2007; Snyder and Williams, 2003).

In this research we have studied the amount of above ground biomass and occurrence of *Prangos cheilanthifolia* (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.

Figure 1. Part of Shanjan Rangeland in Shabestar District, East Azerbaijan Province, Iran.

Table 1. Scientific name for *Prangos cheilanthifolia* classification report (ZipcodeZoo, 2011).

Domain	Eukaryota - eukaryotes
Kingdom	Plantae - Plants
Subkingdom	Viridaeplantae
Phylum	Tracheophyta - Vascular plants
Subphylum	Euphyllophytina
Infraphylum	Radiatopses
Class	Magnoliopsida - Dicotyledons
Subclass	Cornidae
Superorder	Aralianae
Order	Araliales
Family	Apiaceae - Carrot family
Genus	*Prangos*
Specific epithet	*Cheilanthifolia* - Boiss.
Botanical name	*Prangos cheilanthifolia* Boiss.

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

Plants in Prangos family are herbs (Table 1 and Figure 2), perennial with root long-conic and woody, stem erect, branched, base clothed in stiff or fibrous remnant sheaths. Basal leaves are caespitose, petiolate, sheathing at base; blade 3 to 4 pinnate; ultimate segments are linear, the entire leaves reduced upwards. Umbels are compound, terminal or lateral; bracts several, linear or lanceolate; bracteoles similar to bracts. Calyx teeth are obsolete. Petals are white or yellow, ovate or elliptic, apex incurved. Stylopodium depressed, almost hidden in the apex of mature fruit; styles short, spreading. Fruit is oblong to ellipsoid, somewhat dorsally compressed; ribs 5, dorsal ribs filiform, lateral ribs winged, or all ribs inconspicuous; mesocarp thick, corky; vittae numerous, small, encircling seed. Seed is face inflexed into a deep T-shaped groove. Carpophore 2-parted. One of genus of this family is *P. cheilanthifolia* that has been studied in this paper (ZipcodeZoo, 2011).

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 (Xiaoyan et al., 2001) (Figure 3).

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 h (Xiaoyan et al., 2001) and scaled dried weight separately.

RESULTS

Results from this study showed that the maximum, minimum and medium stem biomass of *P. cheilanthifolia* in the study area were 2.1, 5.2 and 3.5 g, respectively (Figure 4). Stem height *P. cheilanthifolia* was unsteady from 110 to 60 mm, that average of it is about 85 mm.

Conclusion

In total of 6 plots were identified and 30 samples were studied in this research work. From 30 samples about 68.18% of stem weight was lost when samples were dried.

Vegetation species can have an effect on soil chemical and physical properties (Ardekani, 2003). Increasing *P. cheilanthifolia* 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 has so much important information especially for medicinal plant. Joudi and Bibalani (Bibalani et al., 2010) have 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 et

Figure 2. *Prangos cheilanthifolia* species.

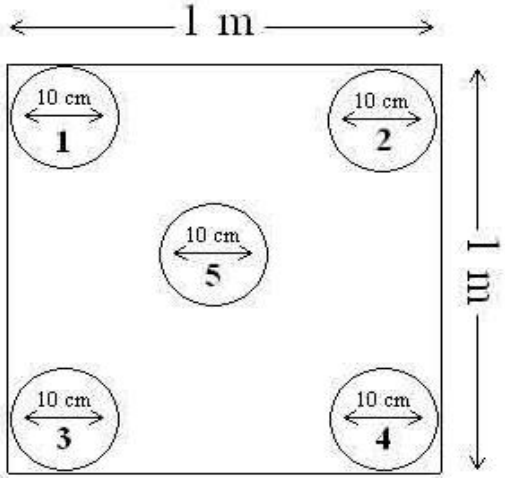

Figure 3. Sampling design in 1*1 m plot (Xiaoyan et al., 2001). 1, 2, 3, 4 and 5 is sub sample in each main sample.

al., 2010; Bibalani, 2011a, b, c; Rodriguez et al., 2007; Shadkami-Til and Bibalani, 2010, 2011) and the difference of wet weight and biomass of this plant would be expected in this area (Bibalani et al., 2010; Bibalani, 2011a, b, c; Shadkami-Til and Bibalani, 2010, 2011).

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

It is a pioneer study, and the results have given estimations of the stem biomass of the *P. cheilanthifolia* 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.

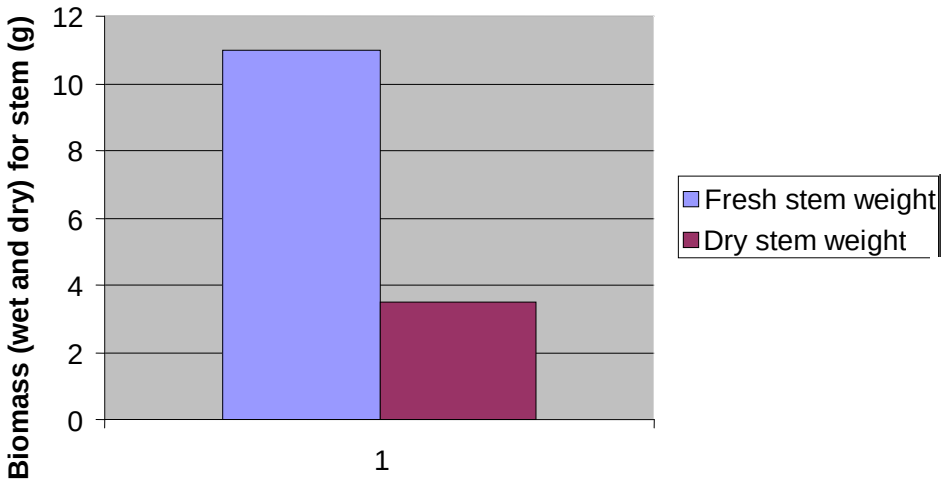

Figure 4. *Prangos cheilanthifolia* stem weight (fresh and dried weight).

ACKNOWLEDGEMENTS

Authors greatly acknowledge the scientific support from the Islamic Azad University-Shabestar Branch. 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.

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