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Average Stem Biomass of *Lappula microcarpa* in Shanjan Rangelands, East Azerbaijan, Iran

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Abstract: 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 *Lappula microcarpa* to determine its stem biomass characteristics. Data were collected with accidental sampling method (1×1 m) in this aria. In total of 20 plots were collected and 100 samples were studied in this research. Minimum, maximum and mean stem biomasses of this plant were 6.2, 11.3 and 9.5 g, respectively.

Key words: *Lappula microcarpa*, rangeland, stem biomass, accidental, vegetation, Iran

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 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-Gonzalez *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^{-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-Gonzalez *et al*., 2002).

Most evidence is related to its negative effect on aboveground vegetative and reproductive plant biomass (Day *et al*., 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; McNaughton *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 (Oesterheld and Sala, 1990) and the invasion of woody plants (Milchunas and Lauenroth, 1993; Schlesinger *et al*., 1990; Rodriguez *et al*., 2007).

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; Snyder and Williams, 2003, Rodriguez *et al*., 2007).

In this research, we have studied the amount of over ground Biomass and *Lappula microcarpa* species (Fig. 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 district with distance is about 5 km from it (Fig. 1). This area is hill area and we study on N aspect. This region is component Flora Iran and Turan with elation between 1700-1850 m (Pabot and Beck, 1990). Lappula is a genus of flowering plants in the borage family known, generally as stickseeds (Table 1, Fig. 2). They are native to the northern hemisphere. These are annual herbs producing funnel-shaped flowers and prickly fruits.

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Fig. 1: A part of Shanjan rangeland from Shabestar district, East Azerbayjan province, Iran

Fig. 2: *Lappula microcarp* sp.

Table 1: Scientific name for *Lappula microcarpa* classification report (USDA, 2010)

Kingdom	Plantae-Plants
Subkingdom	Tracheobionta-Vascular plants
Superdivision	Spermatophyta-Seed plants
Division	Magnoliophyta-Flowering plants
Class	Magnoliopsida-Dicotyledons
Subclass	Asteridae
Order	Lamiales
Family	Boraginaceae-Borage family
Genus	*Lappula* sp.-stickseed

Stem biomass was sampled in May and Jun, 2010. For recognition of species for sampling, we used of accidental sampling method (1×1 m plot) and select 20*5 = 100 samples totally (Ping *et al*., 2010) (Fig. 3). Produced sapling from area studding plants after sending to laboratories, they scale fresh weight of over ground part with careful and sensitive scale then dry weight of over

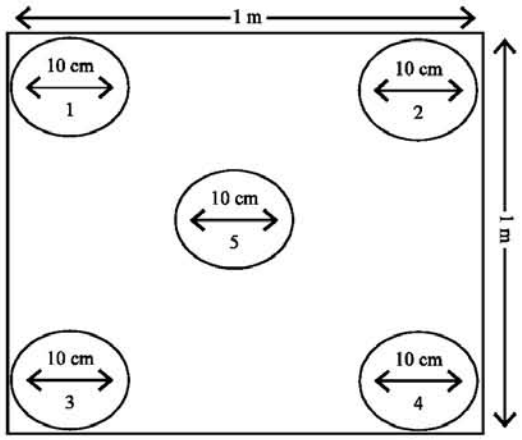

Fig. 3: Sampling design in 1×1 m plot (Ping *et al*., 2010)

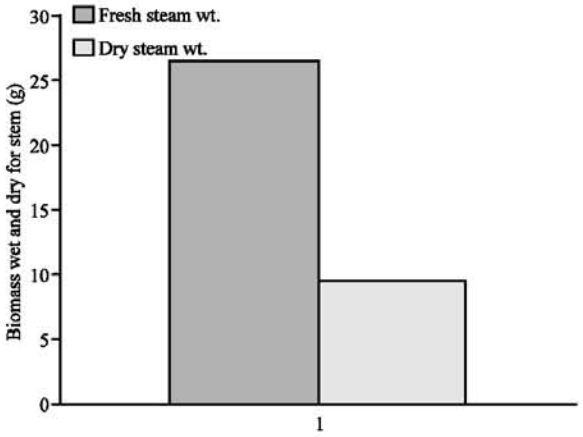

Fig. 4: Lappula microcarpa steam weight (fresh and dry weight)

ground part of plant is determined by Avon set after drying in 80°C temperature during 24 h (Ping *et al*., 2010).

RESULTS AND DISCUSSION

Results of this study have been showed that the maximum, minimum and medium stem biomass of *Lappula microcarpa* in studding area were DDD, EEE and FFF g, respectively (Fig. 4). Stem height *Lappula microcarpa* was unsteady from 320-675 mm that in average it is about 550 mm.

CONCLUSION

In total of 20 plots were collected and 100 samples were studied in this research. In total of 100 samples of about 64.15% of stem weight have been losses when samples dried. Vegetal species can effect on soil chemical and physical properties (Ardekani, 2003). Increasing

Lappula microcarpa 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 and Bibalani, 2010, 2011).

CONCLUSION

This study has revealed and quantified the stem biomass of the *Lappula microcarpa* in the Shanjan rangelands, the plant has good biomass in this research area and probably also in other areas where the *Lappula microcarpa* 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 *Lappula microcarpa* for the first time in Shanjan rangeland. It 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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