

## Over-under ground Biomass characteristic of perennial Species (*Lappula microcarpa*) in northwest Iran (Till area of Shabestar)

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**ABSTRACT:** *Lappula microcarpa* (Ledeb.) is an important perennial shrub widespread in the range areas of the arid and semi-arid phytogeographical region in northwest Iran. Previous studies have shown great variability in forage biomass production per plant among different varieties. Research area is of rangeland of Till village from Shabestar district with distance is 25 Kilometers from it. This area is semi arid area and this land covered with natural range land grasses. Root and shoot in these species were sampled in one stage from Mar to Aug. roots of plants stable soils on slope and provide resistance against the forces that improve slope instability. We studied: *Lappula microcarpa* to determine its characteristics. Data were collected with random sampling in this area with 1m<sup>2</sup> in 64 quadrat plots. Mean, Max and Min over ground biomass of this plant is 0.17, 1.58, 1.25 g<sup>-2</sup>, respectively.

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**Key words:** Root biomass, *Lappula microcarpa*, rangeland and soil.

### 1. Introduction

Many scientists believe that the relative production of different plant species is the best measure of these species' role in the ecosystem. Therefore, some measure of production is often used in dominance studies. Production is considered a good measure of plant dominance on a site because it reflects the amount of sunlight, water and minerals a plant is able to capture and turn into biomass. Biomass in rangeland studies generally refers to "phytomass" only because weight of animal mass in a given area is extremely difficult to measure. Clipping vegetation to ground level and then weighing it is the most direct and objective way to measure herbaceous biomass (Kirmse and Norton, 1985, Lambert, Ung, and Raulier, 1996).

There is little information on root architecture of plants growing on semi-arid rangeland where soil nutrient heterogeneity and defoliation might impose particular restrictions on root growth. In this research we determined root biomass and production of perennial plant species (*Lappula microcarpa* Ledeb.) stands during one growing seasons. The understudy root biomass, encompass and production varied in relation to stand age, although the variation was not statistically significant. The depth distribution of biomass and encompass of fine roots varied with stand age. Most of the *Lappula microcarpa* (Ledeb.) fine roots were located in the mineral soil in the mature and pole stage stands. But

estimation of these Parameters are time consuming and expensive. This parameter need

More attention, but it is one of the determined of stabling position of slope area in that place.

### 2. Material and Methods

Siding area is lied in 25 kilometer of Shabestar between 38° 15' to 38° 17' 30" from northern width and 45° 27' 30"- 45° 30' eastern length of prime meridian and the total space of the area is almost 310.31 k/m<sup>2</sup> for Studying this research, we selected 10 hectare spas from Till Range that it includes foot with southern facing of geographic. This land covered with natural range land grasses. Misho Mountain can cause weather adjustment and finally it can cause engendering of mountainous weather (Farahvash, 2004, Salimi faed, 2003). Vegetal Species, that grows naturally in Azerbaijan of Iran and commonly found in rangelands areas, were selected this species for test in (table1) the Scientific and Farsi name of that species with blossoming time and local position.

### ETHODS OF DOING RESEARCH

Because of an irregular interference specially in northwest of the country and changing control pasture to agricultural lands, in recent decades, *Lappula microcarpa* Species is omitted from Range area. And its density has remarkable decrease. We use accidental sampling method for determine this

species for sampling. In simple accidental sampling method we were given equal chance to each people or society (Farahvash, 2004). In this stage we survey 1m<sup>2</sup> Surface Plat and with rate of 3.33% from total stage by noting to studying area extent and spread Species. Sampling is done from beginning of Apr to the late of the Jul. And the end of that is done the late of the May when 60% were used from above statistics method in this season. And all of the present Plants in Plats were measured separately in two parts but after Plants sampling (Shadkami and Bibalani, 2010<sub>a</sub>, Shadkami and Bibalani, 2010<sub>b</sub>).

**LABRATORIES STUDYING**

Produced sapling from area studying Plants after sending to laboratories, each plant was photographed to record general above- ground and below-ground morphology/architecture prior to bang dissected into its component parts to determine biomass. Above-ground biomass was measured by separating the foliage, branches and stem. Each component was oven-dried at 80°C for 24 h then weighed. Below-ground biomass was determined by hosing roots clean of soil.

Before they were oven- dried at 80°C for 24 h then weighed. The dry weigh of each plant component was recorded to the nearest 0.1g<sup>-2</sup>. And statistical analyzing is done by Excel.

Table 1. Collected and determined species with blossom time and geographic height (Ghahraman, 2002, Mozaffarian, 2007).

Dicotyledonous	Angiosperms gamopetalous
Family	Boraginaceae
Species binominal name	<i>Lappula microcarpa</i>
Species Persian name	Khar langariye miveriz
Blossoming time	May to Jul
Geographic height	Collecting place: Hussein abad till Height 1425 m

**3. RESULTS**

Results of this showed that in studying area root depth of Plant was 11.5 cm and average stem height 41.25 respectively, the max, min and med root of Biomass in studying area 0.61, 0.36, 0.25 g<sup>-2</sup>/m<sup>2</sup>.

Table2. Calculation is done for vegetal species.

Plant	Average	Average	Total	Total
binominal	height	root	Weight	Weight
name	(cm)	depth	dry stem	dry root
		(cm)	(g <sup>-2</sup> )	(g <sup>-2</sup> )
<i>Lappula microcarpa</i>				
Average				
In unit Surface	41.25	11.5	0.17	0.61
Max	47	12	1.58	0.36
Min	35.5	11	1.25	0.25

*Lappula microcarpa* Species results show that average over ground of Plant Biomass is about 0.17 g<sup>-2</sup>/m<sup>2</sup> and average under ground of Plant biomass is about 0.61 g<sup>-2</sup>/m<sup>2</sup> (Fig1).

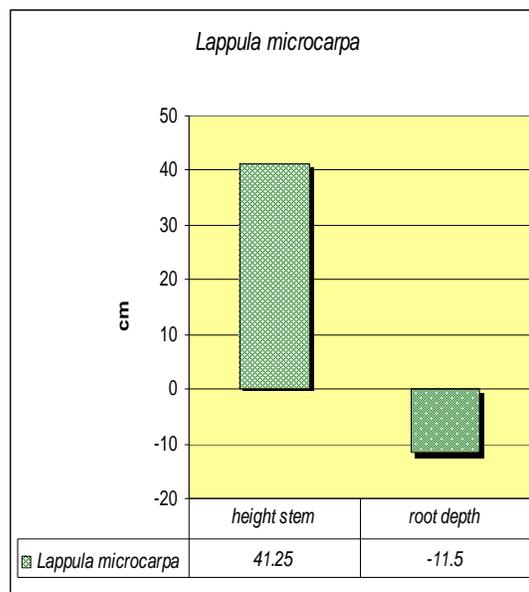


Fig1. *Lappula microcarpa* species average over and underground biomass.

The results showed that *Lappula microcarpa* species root depth is 11.5 mm and stem height is 41.25 mm (Fig 2).

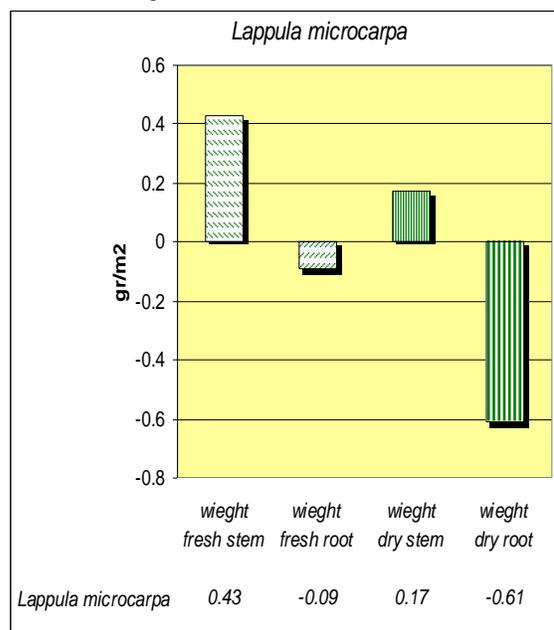


Fig2. *Lappula microcarpa* species average root depth and stem height.

#### 4. Discussions

At various places in a pasture the plate is allowed to fall freely into the vegetation. The height of the plate on the pole is recorded. Plate meter readings are related to biomass because how far the disk falls depends on the height and density of the vegetation in the plot. Cover, height, and density estimates have also been used to estimate biomass and have been found reliable in some vegetation types. Aboveground net primary productivity (ANPP) is a useful synthetic indicator of grass response to shrub encroachment, climate change and activities such as livestock grazing and fire; and peak current year's biomass is often used to estimate grass ANPP (Scurlock, Johnson, and Olson 2002). Allometric models are based on correlations between biomass and morphological characters, such as basal diameter (or area), height, canopy diameter, or canopy volume. They have been used to estimate biomass of trees and shrubs (Ares and Fownes 2000). These results are consistent with previous work for grasses (Andariese, Covington 1986, Assaeed, 1997 and Guevara, Goninet, and Estevez 2002), and trees (Cook, Stubbendieck, 1986, Lambert, Ung, and Raulie 1996), where there was little improvement in predictive strength when adding height to single-species or multi species models that already contained diameter. In this experiment, the increases in the root/shoot ratio showed by Ancon implied a trade-off in total dry matter production. Root biomass (coarse and fine roots) as a proportion of total plant biomass varies between 18 and 40% depending on the species, age and site (Shadkami and Bibalani, 2010<sub>a</sub>, Shadkami and Bibalani, 2010<sub>b</sub>).

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