

Comparison of a biometric method with clipping and weighing method for estimating the yield of *Artemisia sieberi* (case study Zarand-e-Save region)

H. Dianati¹, M. Abedi¹, E. Shahriary² and H. Arzani²

¹Tarbiat Modarress University, College of Natural Resources, Range Management Department, P. O. Box: 46414-356, Noor, Mazandaran, I. R. Iran, Email: dianatitilaki@yahoo.com, ²Tehran University, College of Natural Resources, Range Management Department, P. O. Box: 31585-4314, Karaj, Tehran, I. R. Iran

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Introduction Forage production is a most important vegetation attribute in rangeland analysis and evaluation and use in management practices. *Artemisia sieberi* covered about 47% of the rangeland area in Iran and scientists need to know the best method for analysis and evaluation of this species. Clipping and weighing has high precision, but this method is time-consuming and expensive and alternative methods are required. Russian scientists developed a biometric method based on plant dimensions and suggest this method for rangelands in the Middle East (discussed by Dianati, 2003). In America, Muray (1982) used plant dimensions for yield estimation and regression models for estimating production. This method required the selection of a lot of individual plants for each species to draw curves and estimate forage production. The critical stage of this method is the determination of the relationship between plant dimensions and yield. The research showed that in *A. sieberi* the best relationship with yield is from height (H) and the sum of diameters ($D_1 + D_2$). This relationship should be calculated separately for each species. In this study this method was tested with the *Artemisia* type in Iran.

Materials and methods The *Artemisia* type in one key area of the Zarand-e-Save region was selected. For testing the application of this method plants were divided into two groups - middle and small size. For each group, 20 individual plants were selected randomly and after measuring height and the sum of diameters, the plants were clipped and weighed. Forage production curves were then estimated. Measured and estimated data were compared by two paired T tests with Minitab software.

Results Mean and SE of means for measured and estimated groups are given in Table 1. There were significant differences in the middle-sized plants ($p < 0.01$) but not for the small-sized plants ($p > 0.05$).

Table 1 Measured and estimated values for the weight of plants of *Artemisia sieberi* (g)

Group		Mean	SE mean
Middle-sized <i>Artemisia</i> (30 < H < 60 cm)	Measured	10.4**	1.21
	Estimated	14.4**	1.26
Small-sized <i>Artemisia</i> (H < 30 cm)	Measured	5.7 ^{ns}	0.624
	Estimated	6.25 ^{ns}	0.598

Conclusion This study illustrates that plant size affects the applicability of this method, because there was a good relationship for small plants, but not for middle-sized plants. This method is cheap, easy and not destructive. The method should be tested with other *Artemisia sieberi* types with the possibility of developing pooled equation modeling across the Middle East.

Reference

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