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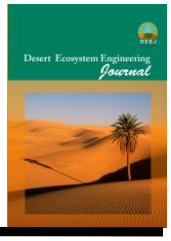

Investigation The Representative Locations for Measuring and Monitoring Vegetation Sites along the Elevation Gradient of Taftan's Southern Slope

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Expanded abstract

Introduction: Continuous and long-term measurement of vegetation is required to obtain basic and timely information concerning rangelands. The important point to consider in this regard is the correct choice and the proper number of representative places to be taken into account when measuring vegetation density in different ecological areas. On the other hand, monitoring rangeland ecosystems is exessively costly, requiring a great number of personnel and technical facilities. However, failing to monitor the rangelands in those areas that are representative of a wide range of vegetation prevents the achivement of desired results concerning vegetation monitoring. Therefore, as measuring and monitoring the vegetation of macro rangeland ecosystems of Iran requires the investigation of several landmarks / sites over a specific period, this study sought to monitor the vegetation of a number of select representative sites along the elevation gradient of Taftan's southern slope.

Material and Methods: First, several places representing the habitats of the region and the distribution of Taftan Mountain's vegetation along the altitude gradient were selected by examining the maps of Iran's ecological zones (Khash region). Then, vegetation characteristics of the places, including percentage of canopy cover, number of bases per hectare, and amount of species forage production were measured, followed by the classification of sampling units based on similarities in species composition. To this end, four 450-meter transects with a distance of 100 meters from each other were used in the first place, which is dominated by *Hammada salicornia* and *Zygophyllum atriplicoides*. On each transect, 15 four-square meter plots (2× 2 m), that is 60 plots in total, were placed 30 meters away from each other. The second place that was dominated by

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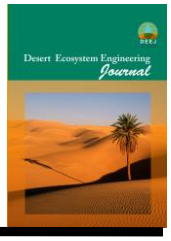

Hammada salicornia, *Zygophyllum atriplicoides*, *Artemisia sieberi* and *Artemisia santolinifolia* species resembled the first place in terms of sampling network and the number of sampling units. On the other hand, three 100-meter transects were used in the third place with 50 meters' distance from each other, on each of which 10 two square-meter plots (2×1 m) were placed 10 meters away from each other (30 plots in total). The lower vestibule of the third place was dominated by *Artemisia quettensis*, *Artemisia sieberi,* and *Artemisia deserti* (herbaceous species), and the upper vestibule of the place was dominated by *Amygdalus scoparia (*the woody element). Moreover, in the fourth place dominated by *Artemisia quettensis* and perennial herbaceous species such as *Ferula ovina*, four 100-meter transects were used with 50 meters' distance from each other, on each of which 10 one-square meter plots were placed 10 meters away from each other (40 plots in total). To classify sampling units based on species compositional similarities, the sites' vegetation was first classified into ecological groups using Twinspan analysis. Then, the correlation between the groups and topographic factors (slope, direction, and height) was investigated via principal component analysis (PCA), and the significance of the model was evaluated by P-value. Furthermore**,** thee collected data were analyzed using the Pc-OIRD software version 5.1.

Results: The study's results indicated that the average canopy cover in the studied sites were 17%, 28.9%, 52.6%, and 40.8%, respectively, during the growing season at 2021, with the sites' average forage production being 32.8 kg/ha, 46.0 kg/ha, 107.7 kg/ha, and 208.8 kg/ha. Moreover, compared to the potential forage production in steppe areas (200 kg/ha), the sites' producation capacity (against the ultimate production limit) was found to be 16.4%, 23.0%, 53.5%, and 100%. Based on the results of the classification, the first axis had the highest positive correlation with the dominant species of the first and second places, that is, the *Hammada salicornia and Zygophyllum atriplicoides*, suggesting that the similarities within the species of the two places are the same. The second axis was also found to have the highest positive correlation with *Artemisia quettensis* and *Ferula ovina* (the dominant species in the fourth place), indicating the distinction of the similarities within the species of the place form other three places, especially from the first and second places. On the other hand, compared to other sampling units, those of the third place where *Artemisia quettensis*, *Artemisia sieberi,* and *Amygdalus scoparia are dominant* were found to have an intermediate distribution, with their species mainly having a negative correlation with the first and second coordinate axes.

Discussions and Conclusion: According to the results of this study, selecting at least three representative locations (site) along a region's altitude gradient to monitoring vegetation on a regional scale, it is necessary to select. A site can represent desert ossuaries (altitude range 1500-1700 m) dominated by *Hammada salicornia* and *Zygophyllum atriplicoides*. The other two sites can represent both middle-altitude mangroves (located at altitude range of 1700-2500 m) dominated by *Artemisia quettensis*, *Artemisia sieberi*, *Artemisia deserti*, and high-altitudes above the tree line (more than 2800 m) whre *Artemisia quettensis, Ferula ovina,* and cushion plants are predominant. Therefore, it could generally be argued that applying the results of vegetation monitoring and measurement to a specific scale on a wider scale requires the consideration of temporal and spatial scales of monitoring (customary order scale, landscape scale, and regional/national scale), taking into account the existence of different issues and data.

Keywords: Continuous Assessment, Rangeland Measurement, Rangeland Monitoring, Rangeland Ecosystems, Vegetation Changes.

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