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Locating Potential Sites for Species (*Ammodendron persicum*) in Southern Kerman province, Using AHP Method

Ali Khanamani[1] , Farideh Bameri Nejad[2*]

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Extended Abstract

Introduction: One of the most important environmental problems in the south of Kerman is the influx of fluids into man-made structures and residential areas, requiring careful consideration and a practical solution. *Ammodendron Persicum* is a local species of Divdal, firewood, lumber, sand, tree, sand, and thistle and is native to Qaen and Taybad in Khorasan province. Being a sub-family of the butterfly (Papilionaceae), it belongs to the legume family (Fabaceae). Divdal is a shrub-like species with a height of 6.8 m whose critical activity generally begins in the second half of March. Moreover, it flowers in mid-May and sows until late June. It generally grows in a rainfall rate of 70 mm, but the species grows well in 150 mm rainfall, being highly drought-resistant as a result. Horizontal and vertical expansion of the roots of this plant is one of the reasons for its drought resistance. Divdal regeneration in the arena occurs in the form of seed and branch. It has a particular dependence on anthropogenic sand, as it only germinates on these habitats. Overall, due to the Divdal ecological features, the species is suitable for germination on sand dunes, reduces wind speed, and has good prospects for use in other areas.

Material and Methods: To identify susceptible areas of Divdal species (*Ammodendron persicum*) in southern Kerman through the Hierarchical Analysis (AHP) method, all factors affecting Divdal species growth were identified as layers of precipitation, altitude, geomorphology, Salinity, and land use (Fig. 2). Then, all layers were processed and evaluated in the same GIS environment using the same reference system with the same scale and the same cell size. To determine the significance of the indices, the relative importance of each criterion was determined via a hierarchical analysis model, using the Expert Choice software. Each criterion was then fuzzed by ArcGIS software and was numerically zero to one. Next, by integrating the AHP and Fuzzy models, all the standardized layers in each of the weights were obtained from the hierarchical analysis model.

1- Phd in Desertification, Yazd University, Iran
2- M.Sc. Graduate of Natural Resources Engineering, University of Tehran, Iran Email: fbameri.n83@gmail.com
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They were multiplied and thus transformed into fuzzy weighted layers. In the next step, multiplication and fuzzy multiplication operators were performed on the layers and overlapping layers, and finally, by fuzzy map classification, the final map of Divdal species susceptible areas was prepared.
The hierarchical analysis process begins by identifying the elements of decision making and prioritizing them. In the placement process, evaluations are made after defining the overall goal and identifying the criteria that are effective in reaching the right place.

Results: In this study, the results of the AHP model showed that out of the five main criteria in locating Divdal species susceptible areas, land use, precipitation, elevation are ranked among the top three with their relative importance being 0.38, 0.25, and 0.18 respectively. Also, geomorphology and salinity ranked fourth and fifth in this regard, with relative importance reported as 0.11 and 0.08, respectively.

Discussion and Conclusion: Geomorphologically speaking, the Divdal species prefers mostly plain as its growth site. Moreover, erosional, mountainous, and lowland areas were identified as suitable grasslands for this plant. accordingly, erosion and impoundment with the relative importance of 0.54 and 0.26 are of most importance in the establishment of Divdal species, and covered plain, mountain, and plain with the relative importance of 0.11, 0.05, and 0.02 are respectively at the lowest level of significance. In terms of annual precipitation, it could be argued that Divdal species grows in low-rainfall areas, but the higher the precipitation rate is, the better growth would come about. Analysis of the questionnaires revealed that precipitation greater than 180 mm/year was identified as the most important and precipitation less than 70 mm/year as the least important areas for Divdal growth. In this regard, precipitation of more than 180 and 180-100 mm are ranked first and second with significance levels of 0.56 and 0.26, respectively. On the other hand, precipitation rates that fall in 70-100 and less than 70 class with the relative importance of 0.11 and 0.05 are considered less suitable for Divdal growth. In terms of its resistance to salinity, the salinity of 0 to 4 dS /m was selected as the best growth area for this species, as with an increase in salinity, the importance of this sub-criteria decreased. Thus, the salinity of 0-4 dS/ m has the relative importance of 0.71, and salinity classes of 4-16, 16-32, and more than 32 dS/m have the significance of 0.14, 0.08, and 05, respectively. As for the suitable height for Divdal species growth, altitudes greater than 800 m with the relative importance of 0.66 was selected as a suitable height for growth of this species, considering the fact that Divdal is a cold-resistant species. Also, areas less than 800 meters high with a significant rate of 0.33 are less important in this regard. In terms of land-use, since the Divdal is a completely sandy species (Psammophyte), land use was, therefore, divided into two sections of sand and non-sand dunes, and the use of sand dunes with relative importance. 0.9 is considered as the most important, with other land-uses having relative importance of 0.1.
The results of this study indicated that AHP was a very convenient and easily applicable method for locating suitable areas for the cultivation of various plant species and its integration with powerful tools such as GIS enhanced its efficiency. According to the research findings, it could be argued that the use of a hierarchical analysis method in environmental planning is very important and could help planners put a natural problem into a hierarchical structure and then quickly and accurately find a solution for it.

keywords: fuzzy, criteria, expert choice, *Ammodendron persicum*.