

## Analyzing Spatial Pattern of *Fagus orientalis* Lipsky. Species in Hyrcanian Forests by Angular Indicators (Case Study: Nave Asalem- Guilan Forests)

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(Received: 22. Oct-2016; Accepted: 7. May-2017)

### Abstract

It is so important to know about ecological characteristics of trees of a stand, in forest management. The first step to achieve this knowledge is to recognize the spatial pattern of trees. Therefore, regarding the enviro-economic importance of *F. orientalis* in hyrcanian forests, this study checked spatial pattern of these trees. In order to do this research, 5 one-hectare plots with homogeneous environmental conditions were inventoried in natural stands of Fagetum in Nave Asalem, Guilan province accidentally. Then, measuring the angle between fagus trees and using indicators of uniform angle index ( $W_i$ ), Mean directional index ( $R_i$ ), Mean of angles index and Clark-Evans (CE), the spatial pattern in *Fagus orientalis* was analyzed. The results showed clumpy pattern of the *Fagus orientalis* trees which is also tended to be random, and using  $W_i$ ,  $R_i$  and CE indicators together provides better results to determine the spatial pattern of trees. Also, using angular indicators, besides the high accuracy due to the lack of need to measure distances between trees, speeds up spatial pattern determination of forest stands.

**Keywords:** Spatial pattern, *Fagus orientalis* Lipsky, Uniform angle index, Mean directional index, Guilan province.

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