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## Perovskia abrotanoides as a plant for multi-purpose uses

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**Key words :** *Perovskia abrotanoides* , Lamiaceae , Autecology , Kashan

**Introduction** *Perovskia abrotanoides* of Lamiaceae family is a medicinal plant which grows mostly near waterways and mountainous ravines . Azarnivand et al . (2005) studied the essence of this plant and showed that the essence contains camphor , camphene , limonene , cineol and careen . In this study we investigated autecological characters of this plant in Kashan .

**Materials and methods** Study area : The study area is in Kashan (Isfahan province) , located between 33° 30' to 34° 30' N and 51° 45' E .

Methods of investigation : In this research , the nearest neighborhood method was used for assessment of parameters such as density , vegetation cover and plant biomass . Six sites were selected in which ten 50m transects were done randomly . For each 10m distance , the nearest plant species was determined and the nearest neighbor was chosen .

Density : the following formula was used for assessing density :

$$D=10000/r(d^2) \quad (1)$$

Where D is Density (plant per hectares) , d is Average of distance between two plants (m) , r is Constant number (1.67)

Percentage of vegetation cover : We used these formulas :

$$d=d_1+d_2/2 \quad (2) , \quad r=d/z \quad (3) , \quad s=\pi r^2=3.14r^2 \quad (4)$$

Where  $d_1$  and  $d_2$  are Small and large plant diameter , r is Average of crown diameter , s is Area of same circle for vegetation cover

$$S=S_1+S_2+\dots S_n/n \quad (5) , \quad C=D \times S \quad (6) , \quad \%C=C/10000 \times 100 \quad (7)$$

Where S is Mean of plant cover area , C is Allocated area for each individual plant , D is Density , %C is Percentage of plant cover ; percentage of cover was determined using of 10 × 10m plots .

Plants biomass : 30 plants were harvested and plant biomass was calculated using this formula :

$$BW=W \times D \quad (8)$$

Where BW is Plant biomass per hectare , D is Density , W is Mean weight of 30 plants .

Phenological investigation : The observation and recording of plant in dormancy and activity periods was done every 7 and 15 days . For soil study ; in each site 5 profiles were sampled at depths of 0-30 . Soil texture was assessed by hydrometric method .

**Results and discussion** The results showed that the density was 1046 plants per hectare , mean vegetation cover was 10.13% and mean biomass was 3278 kg/ha . The soils have high levels of lime , and soil depth was shallow to very shallow having stones and marbles . Precipitation amount is between 140 to 255mm . This plant because of too much essence , similar to *Artemisia* , can be grazed by livestock after raining . Phenological studies showed that initiation of growth is early April . Vegetative stage is from mid April to last of May . Flowers appear from mid June to September . Seeds form in September .

**Conclusions** *P. abrotanoides* is a medicinal plant with multipurpose uses . It can be used as valuable forage ; moreover it has pretty flowers that persist for nearly 4 months and the plant can be used for landscaping in arid and semi-arid regions .

### Reference

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