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Investigation of Silvicultural Practices Baskomutan Historical National Park Of Turkey

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***Abstract:** This study was carried out on national park which was one of the most important gene conservation and social-cultural area to contribute forestry practices of the national parks. For the purpose, height and diameter were measured together with number of individuals from the sampled areas at the Baskomutan National Historical Park of Turkey divided into tending, forestation and natural areas. Collected data was discussed based on results of statistical analysis.*
Number of removed individuals in different years for tending was 15, 12 and 14 of Black pine (Pinusnigra) and Scots pine (Pinussylvestris) in the tending area. Diameters at base of removed trees were between 24.7 cm and 31.0 cm in tending area. Numbers of survival individual of Black pine were 35, 19 and 17 at sampled each 200 m^2 area of afforestation part. Height of the individuals was ranged from 6.4 m. to -19.1 m. in the area. There were positive and significant ($p \leq 0.05$, $r=0.351$) relations between height and diameter at base of individuals in afforestation based on results of correlation analysis. In natural area numbers of reproduction were sufficient for sustainable forestry. It was 29, 33 and 37 which were at the height and diameter groups in the sampled areas. Positive and significant ($p \leq 0.05$, $r=0.813$) relations between height and diameter at base were also found in this area.
***Keywords:** Gene conservation, National park, planning, silviculture, product*

I. INTRODUCTION

National park is one of the most important gene conservation, historical and social-cultural areas. The park is also a link between past and future in human life by its national and international aspects. It has also important roles in protection of biodiversity and sustainable forestry. The national parks cover 5.6% of Turkey[1], while it is 7.7% in Spain, 8.4% in Russia Federation, and 14% in China. The number of Turkish national parks reached from 40 to 40 between 1960 and 2016[2]. However, forestry practices are restricted in these areas by some law.
This study was conducted to examine based on restricted silvicultural practices in Baskomutan National Historical Park of Turkey to contribute present and future practices in national parks and other protected areas.

II. MATERIAL AND METHOD

Studied Baskomutan National Historical Park which selected as national park in 1981 of Turkey was located at latitude 38°65' E, longitude 30°46' Nand altitude 1855 m asl.(Figure 1).

Figure 1.Views from the national park.

Forest area of the park covers about 37.5% (15435.2 ha) of total area of the park (Figure 1). The forest area was divided into three groups as tending, afforestation and natural areas in the study (Figure 2).

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Figure 2.General views of sampled areas.

Height (H) and diameter at base (D_0) were measured together with number of individuals from the sampled areas which was 200 m^2 at each group as three replicates at end of vegetation period of 2017. Geographic properties of the studied sampled areas were given in Table 1.

Table 1.Details of the sampled areas.

Group	Latitude (N)	longitude (E)	Altitude (m)
Tending area	38.959842	29.969918	1154
	38.964921	29.975471	1209
	38.957203	29.979558	1180
Afforestation area	38.916096	30.051322	1138
	38.844171	29.961208	1249
	38.908622	30.065799	1157
Natural area	38.898059	29.929727	1454
	38.898634	29.947658	1424
	38.916860	29.928503	1375

Collected data was statistically analyzed using SPSS statistical package program discussed based on results of statistical analysis [3]. Correlations among the characteristics were calculated by Pearson's correlation by the package program.

III. RESULTS AND DISCUSSION

Number of removed individuals in different years for tending was 15, 12 and 14 of Black pine (*Pinusnigra*) and Scots pine (*Pinussylvestris*) in the tending area (Table 2). Averages of diameters at base of removed trees were between 24.7 cm and 31.0 cm in tending area, while it ranged from 22 cm to 56 cm for individual trees (Figure 3).

Table 2.Average diameter at base (D_0) and number of removed trees in the tending area.

Species	Sampled area-1		Sampled area-2		Sampled area-3	
	Average D_o (cm)	Number of individual	Average D_o (cm)	Number of individual	Average D_o (cm)	Number of individual
Black pine	31.0	8	27.3	9	26.2	9
Scots pine	24.9	7	24.7	3	26.8	5

It could be said the removed trees were suitable for forest tending purpose according to diameter [4]. Beside, better view was one of the aims of forest tending. It could be suggested that forest tending should be also applied for better view in national park.

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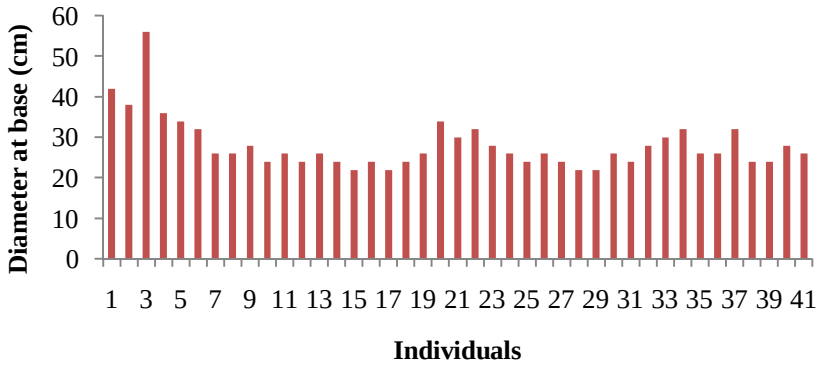

Figure 3.Diameters of removed trees in tending area.

Numbers of survival individual of Black pine were 35, 19 and 17 at sampled each 200 m^2 area of afforestation part. Height of the individuals was ranged from 6.4 m. to -19.1 m. in the area (Table 3). The differences were also supported by results of analysis of variance (Table 4).

Table 3.Averages of height (H) and diameter at base (D_0) and number of trees in the afforestation area.

Characters	Sampled area-1 (39)*	Sampled area-2 (19)	Sampled area-3 (17)
H (m)	6.4	5.0	5.1
D_0 (cm)	16.7	19.1	18.6

*; number of individual in parentheses.

Table 4.Results analysis of variance for the characters in the afforestation area.

Characters	Source of variation	Sum of squares	Degrees of freedom	Mean of squares	F value	*P*
H	Between groups	32.201	2	16.101	16.062	.000
	Within group	68.165	68	1.002		
	Total	100.366	70			
D_0	Between groups	77.383	2	38.692	2.066	.135
	Within group	1273.236	68	18.724		
	Total	1350.620	70			

Statistically significant differences ($p \leq 0.05$) were found among sampled areas for height, while they were similar ($p > 0.05$) for diameter (Table 4). The differences were also showed for the characters in Figure 4.

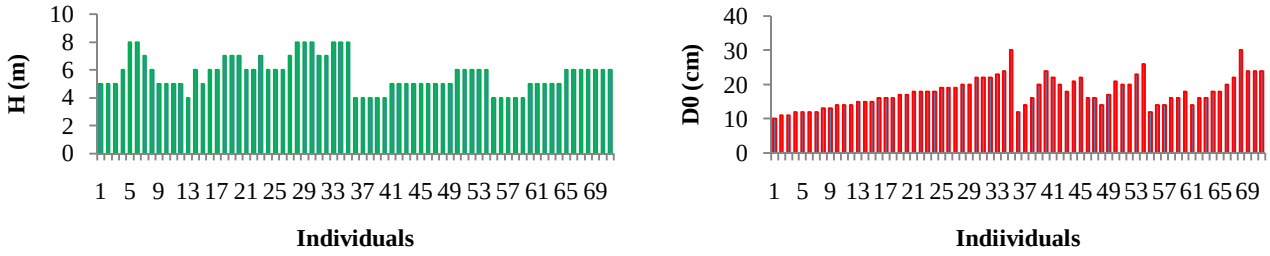

Figure 4.Height and diameters of trees in afforestation area.

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There were positive and significant ($p \leq 0.05$, r=0.351) relations between height and diameter at base of individuals in afforestation based on results of correlation analysis.

Numbers of reproduction were 29, 33 and 37 in sampled areas of natural area described as un-forestry practices area. Averages of diameters at base and height of the reproductions were given in Table 5. Average of height of the individuals was between 40 cm and 65 cm, while diameter was similar in sampled areas (Table 5). The differences were also showed in Figure 5.

Table 5.Averages of height (H) and diameter at base (D_0) and number of reproductions.

Characters	Sampled area-1 (29)*	Sampled area-2 (33)	Sampled area-3 (37)
H (m)	40	60	65
D_0 (cm)	3.0	3.0	4.0

*; number of reproductions in parentheses.

Figure 5.Height variation of reproductions in a sampled area.

In natural area numbers of reproduction were sufficient for sustainable forestry It was also suggested by many researches [5, 6, 7, 8]. Positive and significant ($p \leq 0.05$, r=0.813) relations between height and diameterat base of reproductions were also found in this area. Similar results were also found in different forest tree species [9, 10, 11, 12, 13, 14]. The results should be used in silvicultural practices of the species.

IV. ACKNOWLEDGMENTS

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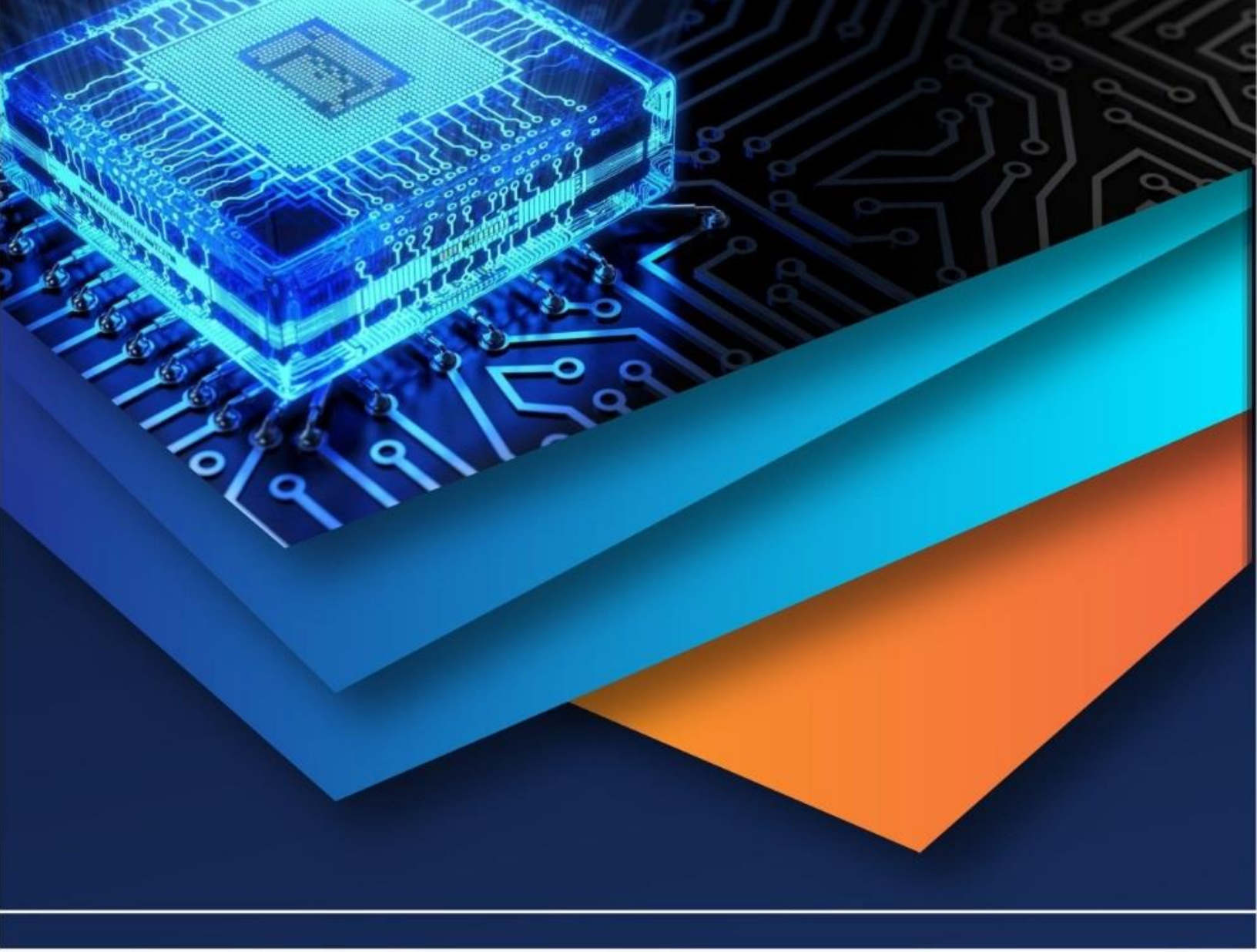

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