



Diameter size class distributions of *Pinus gerardiana* Wall. ex D. Don from Gohar Abad Valley district Diامر, Gilgit-Baltistan, Pakistan

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Abstract

The present study was conducted to assess the diameter size class (Dbh) distribution of Chalghoza forest in Goharabad District Diامر. Data was collected from six different sites randomly using the PCQ (Point Center Quadrant Method) during July and August 2014. Study revealed that *Pinus gerardiana* Wall. ex D. Don is the dominant tree species of this forest, while few trees of *Juniperus excelsa* M.Bieb. and *Quercus ilex* L. were also found. Different stands possess different densities in the study area. Highest density was recorded 128.4 stems/ha with 16.16m²/ha Basal Area from Stand-1 (Latakhand) while lowest density was observed 57.5stems/ha with 3.98 m²/ha Basal Area from Stand-6 (Daskil-C). Size class structure shows more or less satisfactory in the entire study area while some gaps are found in early and middle size classes this indicates anthropogenic and other natural disturbances i.e. nuts collection, cutting, grazing, burning, sliding, floods etc. In the light of this study it is concluded that each forest is disturbed, unstable showing varied size distribution. Most of the forests have low seedlings, young trees or they do not show signs of seedling recruitment. The Present practices are threatening and alarming for the future of these forests. Therefore, proper regeneration activities, management skills and conservation plan should be introduced and applied immediately to rehabilitate and save these valuable forests.

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Introduction

Diamer District is one of the seven districts of Gilgit-Baltistan region of Pakistan with its boundaries meeting Gilgit District in north, Kohistan in South, Astore in east and Ghizer District in the west. The district has two sub-divisions, Chilas and Darel/Tangir, where Chilas town is the district headquarters situated along the Karakorum Highway at an altitude of 1260m above sea level. The district is one of the main private forest hot spots in Gilgit-Baltistan and shelters the naked mountain, Nanga Parbat above the fairy meadows coniferous forests. Forest Division Diamer comprised of seven Forest Ranges; Darel, Tangir, Khanbri, Chilas, Tack/Niat/Babusar, Thor and Gonarfarm. The total area of forests in Gilgit-Baltistan is 2849 sq km, out of which, 2196 sq. km is privately owned by the tribal communities of Chilas, Darel and Tangir in Diamer. The private forest cover estimate is 30% in the district. These forests have been illicitly cut for sale and thus forest area is decreasing fast (GB Forest Department, 2009). *Pinus gerardiana* Wall. ex D. Don grows in the North-eastern portion of the Zhob district, adjoining D.I. Khan and District

Diamer. Champion (1965) declared *Pinus gerardiana* Wall. ex D. Don is the most important economic species in term of edible products of forest Chalghoza is the local name of *Pinus gerardiana* Wall. ex D. Don and it is as native species of Northwestern Himalaya in eastern Afghanistan, Pakistan, India and other scattered localities in the Hindu-Kush Himalaya growing at elevations between 1800-3350 m. It often occurs in association with Bluepine (*Pinus wallichiana* A.B.Jacks), Deodar (*Cedrus deodara* (Roxb.)G.Don) Juniper (*Juniperus excelsa* M.Bieb.) and Oak (*Quercus ilex* L.) (Richardson and Rundel, 1998). Chalghoza is a slow growing tree. Rings counting was done on two stumps and it was found that it took 64 years to attain a girth of 2m at stump level (Javed, 2009).

The overall aim of this study is to determine the current status of Chilghoza pine forests in Goharabad, Diamer. The specific objectives of the study are find out species composition of tree, present Diameter size class structure of the existing forest and to give suggestions and recommendation for the management and conservation.

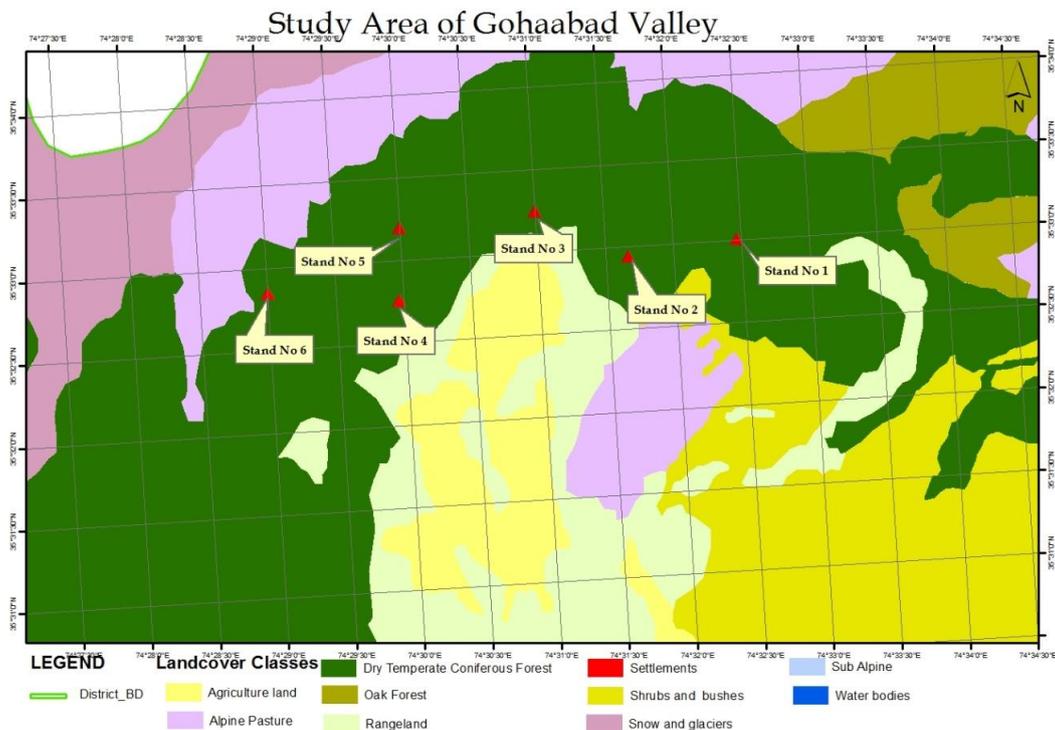


Fig. 1. Shows sampling site of study Area.

Materials and methods

1-Sampling

The (PCQ) Method was developed by Cottam, G. and Curtis, J.T. (1956) as a plot less technique to estimate density. The (PCQ) technique is perhaps the most popular of the plot less sampling techniques Ahmed and Shaukat (2012).

2-Dbh Measurement

For each individual, the species name and its Dbh were also recorded using by Dbh Tap.

3-Geographical Information

GPS was used to record the elevation and geographical coordinates and Aspect, while degree of slope was recorded by slope meter.

4-Statistical Analysis

The statistical analysis was carried out by the method described by Mueller-Dombois&Ellenberg (1974) and Ahmed and Shaukat (2012).



Fig. 2. Shows different stages of data collection, Field sampling, *Pinus gerardiana* Wall. ex D. Don forest of Gohar Abad Valley.

5-Determination of Size Class Structure

Diameter at breast height (Dbh) of each tree in a stand was divided into 10cm Dbh size classes. Total 11 size classes were made according to the range of Dbh which was lesser than 120 cm. Various size classes and size structure of individual stands were made using by MS Excel 2003 and 2007. Further more in each stand, size classes divided into four categories i-e small size classes (10 to 30 cm Dbh), middle size

classes (40 to 60 Dbh cm), large size classes (70 to 90) and above (90 Dbh) extra large size classes. The dominant tree species was selected following the method described by Ahmed (1984), Siddiqui (2011), Wahab (2011) and Khan (2011), Akber *et al.*,2013, Akber *et al.*,(2014), Hussian *et al.*,2013 and Hussian *et al.*,(2014).

Results

Basal Areas and geographical Information are presented in Table-1 While the Size class structure of

each stands are shown in Fig-3 Size classes' distribution of different stands shows the present status and the future trend of these forests.

Table 1. Shows the Geographical Characteristics and Absolute values of Study Area.

Stand#	Elevation (ft)	Coordinate	Aspect	Stems/ha	B.A m ² /ha
1	8794	N 35° 32' 29" E 74° 32'	Western	128.4	16.61
2	8506	N35 ° 32' 38" E 74° 32'	Western	104.92	12.168
3	8354	N 35° 32' 51" E 74° 31'	Eastern	85.14	7.367
4	8499	N 35° 33' 12" E 74° 31'	Northern	72.90	7.163
5	9118	N 35° 33' 15" E 74° 30'	Eastern	98.52	4.320
6	8942	N 35° 33' 06" E 74° 30'	Eastern	57.5	3.982

Key to Abbreviations: B.A= Basal Area, N= North latitude, E=East Longitude

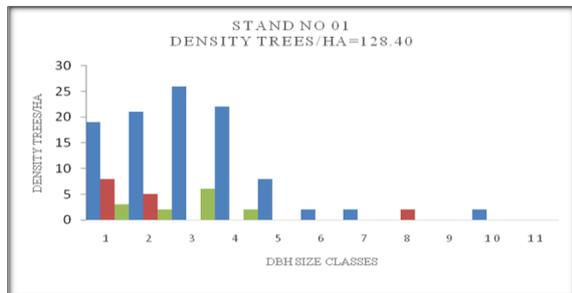


Fig-3 (A)

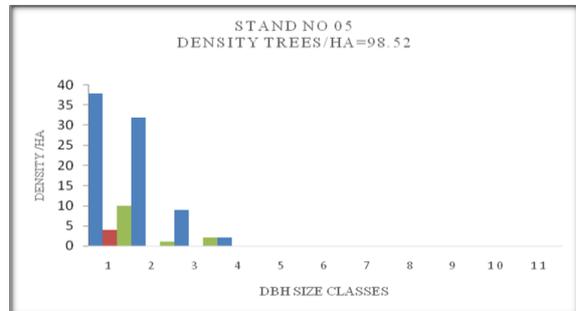


Fig-3 (E)

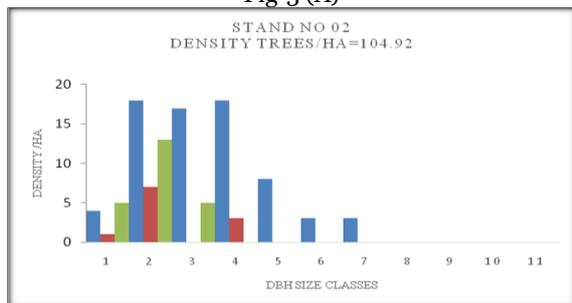


Fig-3 (B)

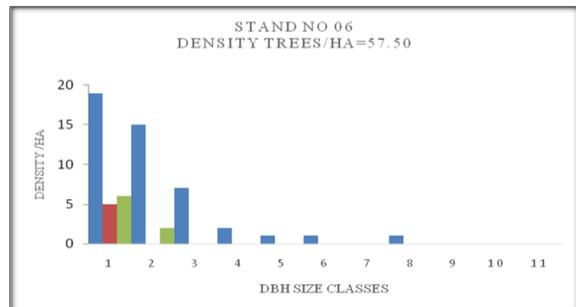


Fig-3 (F)

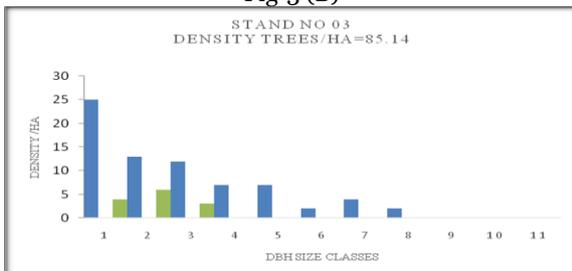


Fig-3 (C)

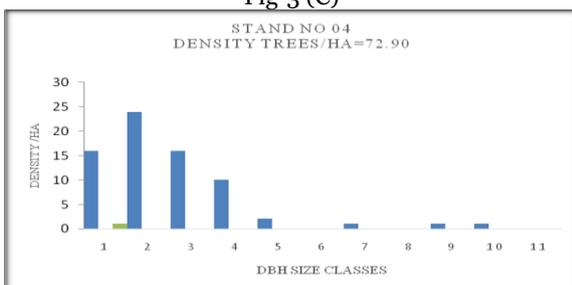


Fig-3 (D)

<i>Pinusgerardiana</i>	
<i>Quercus ilex</i>	
<i>Juniperusexcelsa</i>	

Fig. 3. (A), 3-(B), 3-(C), 3-(D) and (3-F) shows Diameter size class structure of different forest of entire study area.

Results and discussions

Champion (1965) declared *Pinus gerardian Wall. ex D. Don* is the most important economic species in term of edible products of forest Chalgoza is the local name of *Pinus gerardiana Wall. ex D. Don* and it is as native species of Northwestern Himalaya in eastern

Afghanistan, Pakistan, India and other scattered localities in the Hindu-Kush Himalaya growing at elevations between 1800-3350 m. It often occurs in association with Bluepine (*Pinus wallichiana*), Deodar (*Cedrus deodara*) Juniper (*Juniperus excelsa*) and Oak (*Quercus ilex*) (Richardson and Rundel, 1998). Chilhgoza is a slow growing tree. Rings counting was done on two stumps and it was found that it took 64 years to attain a girth of 2m at stump level (Javed, 2009). In the whole study area *Pinus gerardiana* Wall. ex D. Don were found satisfactory and it may be assumed as regular distribution pattern. The rampant decline in growth of Chalhgoza pine throughout the world due to different reasons coerced the conservationists in the arena of natural resource management to include it in IUCN Red list of threatened species (2013). This study described that *Pinus gerardiana* Wall. ex D. Don is the dominant tree species of this forest while few trees of *Juniperus excelsa* and *Quercus ilex* L. also found as co-dominant species. Different stands possess different densities. Highest density was recorded 128.4 stems/ha with 16.16 m²/ha Basal Area from Stand-1 (Latakhand) while lowest density was observed 57.5 stems/ha with 3.98 m²/ha Basal Area from Stand-6 (Daskil-C). Akber *et al.* 2013 reported *Pinus gerardiana* Wall. ex D. Don 41.41/ha Density with (1.9m²/ha) basal area from Mushkin Valley Astore. Size class structure shows more or less satisfactory in the whole study area while some gaps are found in early and middle size classes this indicates anthropogenic and other natural disturbances i.e. nuts collection cutting, grazing, burning, sliding, floods etc these kind of reason also discussed by Khan (2011), Wahab (2011) and Hussain (2013). In the light of this study it is concluded that each forest is disturbed, unstable showing varied size distribution. Similar observation was also reported Shaheen *et al.* (2011), Ahmed *et al.* (2009). Siddiqui *et al.*, (2011)

On the Basis of this study it is concluded that most of the forests have low seedlings, young trees or they do not show signs of seedling recruitment. Present

practices are threatening and alarming for the future in case of other species except *Pinus gerardiana* Wall. ex D. Don. So proper regeneration activities, management skills and conservation plan should be introduced and applied immediately to rehabilitate and save this valuable forest so that these disturbances can reduce and it may be saved these forests for future generation.

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