

**Guidelines
for the Conduct of Test for
Distinctiveness, Uniformity and Stability
On**

Cedrus deodara (Roxb.) G. Don



Protection of Plant Varieties and Farmer's Rights Authority

**(PPV & FRA)
Government of India**

Contents

- I. Subject
- II. Planting Material Required
- III. Conduct of tests
- IV. Methods and Observations
- V. Grouping of Varieties
- VI. Characteristics and Symbols
- VII. Table of Characteristics
- VIII. Explanation for the Table of characteristics
- IX. Working Group Details
- X. DUS testing centers

Deodar (*Cedrus deodara*) (Roxb.) G. Don

I. Subject

These test guidelines will apply to all populations/provenances of Deodar (*Cedrus deodara* (Roxb.) G. Don

II. Planting Material required

1. The Protection of Plant Varieties and Farmers' Rights Authority (PPV&FRA) shall decide on the quantity and quality of the plant material required for testing the population/provenance and when and where it is to be delivered for registration under the Protection of Plant Varieties and Farmers' Rights Act (PPV&FRA), 2001.
2. Applicants submitting such planting material from a country other than India shall make sure that all customs and quarantine requirements stipulated under relevant national legislations and regulations are complied with.
3. The planting material for DUS test should represent populations/provenances and/or individuals within populations/provenances with characteristic features.
4. The planting material should not have undergone any treatment, which would affect the expression of the characteristics of the population/provenance, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of tests

Duration of test

As observations are to be recorded on fully grown trees showing reproductive stage the duration of test should be a minimum two independent fruiting cycles.

Conditions for Conducting the Examination

The population/provenance and individuals possessing characteristics shall be identified by the applicant. If any essential characteristics of the population/provenance are not expressed for visual observation at the selected locations, the population/provenance shall be considered for further examination at another site.

On-site DUS testing

The Expert Committee constituted by the PPV & FRA in consultation with the DUS Centre shall be authorized to inspect on-site testing and recording of the appropriate characters.

- The applicant or his/her nominee on his/her behalf shall submit a request to the Authority for conducting a reliable trial according to Test Guidelines and the instructions from Authority before on-site examination of the candidate population/provenance.
- The applicant or his/her nominee shall submit a request to the Authority for on-site examination prior to start of growing cycle as mentioned in Test Guidelines for site examination of the candidate population/provenance.
- On-site testing may be conducted at the places specified by the applicant. The test shall be conducted on fully grown mature trees.

- A minimum five trees should be available for inspection and examination for 'on site' DUS testing. The trees must be healthy and free from pest & disease.
- On-site examination shall be arranged during the fruiting season, when distinguishing characteristics of candidate population/provenance can most easily be seen. The characteristics of the candidate population/provenance can be examined and compared with those of the comparative population/provenance as per the Test guidelines.
- The Expert Committee constituted by the PPV & FRA in consultation with the DUS Centre shall be authorized to inspect on-site testing and recording of the appropriate characters. Applicant shall supply the Expert Committee with summary of distinct characteristics supported by photographs.
- The Expert Committee shall take notes and observations on distinctness and shall confirm preliminary data and/or summary of distinctness from applicant.
- The Expert Committee shall submit examination report to the Authority.

IV. Methods and observations

- a) The morphological characteristics described in the Table of characteristics shall be used for the DUS testing of populations/provenances (Section VII)
- b) The assessment of distinctiveness and stability of all observations shall be made on five plants or parts taken from each of five plants
- c) Observations on all growth characteristics shall be observed on fully grown mature trees
- d) Observations on all bark and stem shall be made at 1.37 meters from ground level
- e) All branch characters shall be observed in the middle position of crown
- f) Observations on all needle characters shall be made in mature needles
- g) Observations on cones shall be recorded before opening of the cones
- h) For the assessment of all colour characteristics, the Royal Horticultural Society (RHS) colour chart shall be used
- i) Observations on wood characteristics shall be recorded on fully grown mature trees.

V. Grouping of Varieties

The populations/provenances for DUS testing shall be divided into groups to facilitate the assessment of Distinctiveness. Characteristics which are known from experience not to vary or to vary only slightly, within a population/provenance and which in their various states are fairly evenly distributed across all the populations/provenances in the collection are suitable for grouping purpose.

Grouping characteristics are those in which the documented states of expression, even when produced at different locations, can be used either individually or in combination with other such characteristics.

The following characteristics shall be used for grouping

1. Needle Attitude (characteristic 9)
2. Needle colour (Characteristic 10)
3. Branch attitude (Characteristic 7)
4. Crown shape (Characteristic 8)
5. Height with clear bole length (Characteristic 1 & 3)

VI. Characteristics and symbols

1. To assess Distinctiveness, Uniformity and Stability, the characteristics and their states as given in the Table of characteristics (Section VII) shall be used.
2. Notes (1 to 9) shall be given for each state of expression for different characteristics for the purpose of electronic data processing
3. Legend:
 - i. (*) Characteristics that shall be observed during every growing season on all populations/provenances and shall always be included in the description of the population/provenance, except when the state of expression of any of these characters is rendered impossible by the environmental conditions of the testing region. Under such exceptional situations, adequate explanation shall be provided.
 - ii. (+) See Explanation on the Table of characteristics in Section VIII. It is to be noted that for certain characteristics, the plant parts on which observations to be taken are given in the explanation or figures for clarity and not for the colour variation.
4. Characteristics containing the following key in the first column of the Table of characteristics shall be examined as indicated below:

QN: Quantitative characteristics

QL: Qualitative characteristics

5. Type of assessment of characteristics indicated in column 6 of Table of characteristics is as follows:

MG: Measurement by a single observation of a group of plants or parts of plants

MS: Measurement of a number of individual plants or parts of plants

VG: Visual assessment by a single observation of a group of plants or parts of plants

VS: Visual assessment by observation of individual plants or parts of plants

VII. Table of characteristics

S.No	Characteristics	State	Notes	Population/provenance	Type of Assessment
1. (* (QN)	Tree height (m)	Small (< 20) Medium (20-30) Tall (>30)	3 5 7	Labrang Rohanda Cheog/Sarain	MG/MS
2. (* (QN)	Diameter at breast height (cm)	Small (< 40) Medium (40-60) Large (>60)	3 5 7	Udaipur Kandyali Cheog/Chowai	MG/MS
3. (* (QN)	Clear bole length (m)	Short (< 10) Medium (10-15) Tall (15-20) Very Tall (> 20)	3 5 7 9	Labrang Kufri Chopal Cheog/Sarain	MG/MS
4. (* (QN)	Self Pruning ability(m)	Low (up to10) Medium (10-20) High (>20)	3 5 7	Kalpa Nankhari/Chopal Cheog/Sarain	VG/MS
5. (* (QL)	Bark colour	Grey Dark Grey Greyish Brown Reddish Brown Brown	1 3 5 6 7	Rohanda Cheog/Sarain Chpal Kalpa/Labrang Labrang	VS
6. (+ (QL)	Bark pattern	Longitudinal shallow furrows (Moist zone) Longitudinal deep furrows (Drier zone) Longitudinal smooth cracks Smooth shallow cracks Smooth	1 3 5 6 7	Choeg/Sarain Labrang/Kalpa Rohanda Surkhigala Chajpur	VS
7. (+ (QL)	Branch : attitude	Horizontal Angular Drooping	3 5 7	Cheog/Sarain Nankhair Nihar	VS
8. (* (+ (QL)	Crown shape	Conical Flattened	3 7	Cheog/Chowai Shimla/Nihar	VG/VS
9 (* (+ (QL)	Needle: attitude	Erect Drooping	3 7	Nankhari/Cheog Chopal/Shimla	VG/VS
10. (* (QL)	Needle colour	Light Green Green Dark Green Silvery Green Bluish Green	1 3 5 7 8	Shimla/Chopal Cheog/Chowai Sarain/Cheog Kandyali Labrang	VG/VS
11. (+ (QN)	Chlorophyll content (mg/g)	Low (<1) Medium (1-1.5) High (>1.5)	3 5 7	Kalpa/Kandyali Labrang/Cheog Chichar	MS
12. (* (QN)	Cone length (cm)	Small (<7) Medium (7-9) Large (>9)	3 5 7	Labrang/Tharoch Chichar/Rohanda Kandyali/Kalpa	MS
13. (* (QN)	Cone width (cm)	Small (<6) Medium (6-7) Large (> 7)	3 5 7	Labrang/Tharoch Kandyali Chichar	MS
14 *	Cone length: breadth ratio	Small (<1.25) Medium (1.25-1.50)	3 5	Labrang Kandyali	MS

(QN)		Large(>1.50)	7	Chichar	
15. (QN)	No. of seeds per cone	<140 140-150 >150	3 5 7	Tharoch/Labrang Kandyali Cheog/Kufri	MS
16. (QN)	Bending: Maximum load	Low (<100 kgf) Medium (100-200 kgf) High (>200 Kgf)	3 5 7	Labrang/Shimla Nankhari Choeg/Sarain	MS
17 (QN)	Strength	Low (<200 kgf) Medium (200-400 Kgf) High (>400 Kgf)	3 5 7	Rohanda/Shimla Choeg/Sarain Nihar/Chowai	MS

VIII. Explanation for the Table of characteristics

Characteristic 1: Tree height (m)



Small (< 20)
(3)



Medium (20-30)
(5)



Tall (> 30)
(7)

Characteristic 2: Diameter at Breast Height (cm)



Small (< 40)
(1)



Medium (40-60)
(5)



Large (>60)
(7)

Characteristic 3: Clear bole length (m)



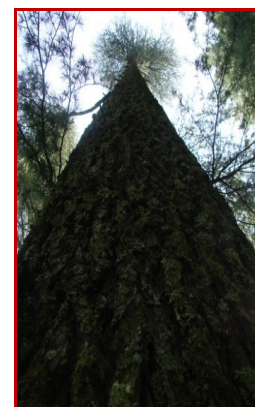
Short (<10)
(3)



Medium (10-15)
(5)



Tall (15-20)
(7)



Very Tall (>20)
(9)

Characteristic 4: Self Pruning ability



**High (>20 m)
(7)**



**Medium (10-20 m)
(5)**



**Low (<10 m)
(3)**

Characteristic 5: Bark Colour



**Grey
(1)**



**Dark Grey
(3)**



**Greyish Brown
(5)**



**Reddish Brown
(7)**

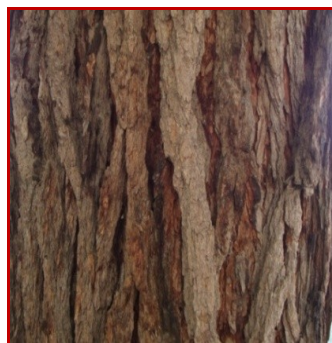


**Brown
(9)**

Characteristic 6: Bark Pattern



**Longitudinal shallow furrows
(Moist zone)
(1)**



**Longitudinal deep furrows (Drier
zone)
(3)**



**Longitudinal smooth cracks
(5)**



Smooth shallow cracks
(7)



Smooth
(9)

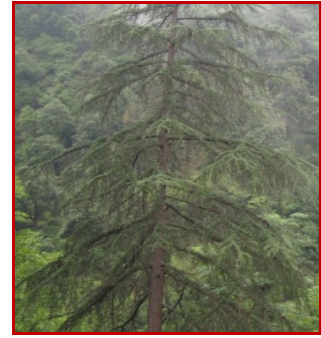
Characteristics 7: Branch Attitude



Horizontal
(3)



Angular
(5)



Drooping
(7)

Characteristics 8: Crown Shape



Conical
(3)

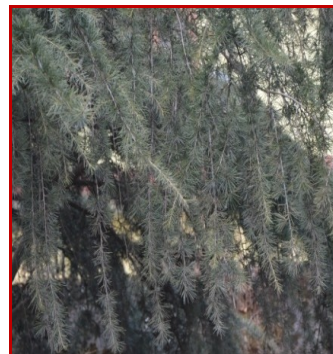


Flattened
(7)

Characteristics 9: Needle Attitude



Erect
(3)



Drooping
(7)

Characteristics 10: Needle Colour



Light Green
(1)



Green
(3)



Dark Green
(5)



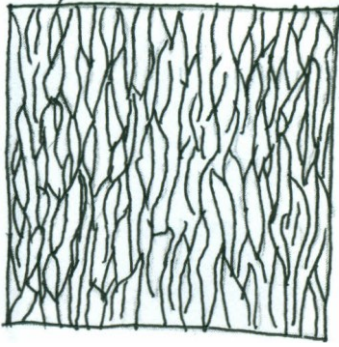
Silvery Green
(7)



Bluish Green
(9)

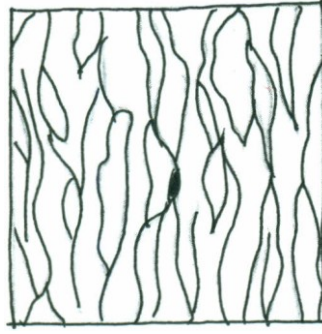
VIII Explanation for the Table of Characteristics

Characteristic 6: Bark Pattern



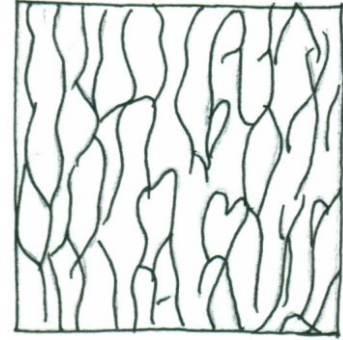
Longitudinal shallow furrows
(Moist zone)

(1)



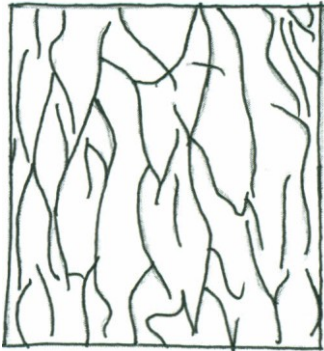
Longitudinal deep furrows
(Drier zone)

(3)



Longitudinal smooth cracks

(5)



Smooth shallow cracks

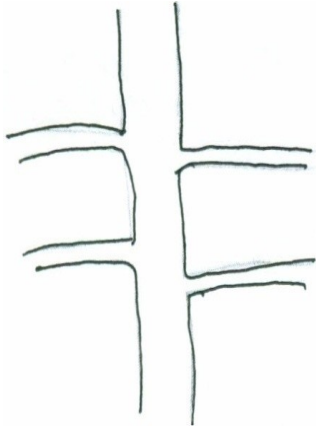
(7)



Smooth

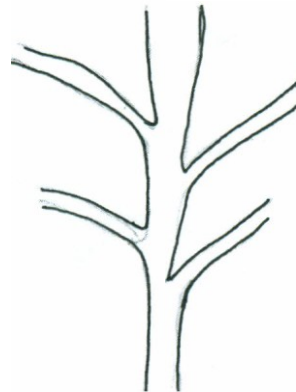
(9)

Characteristic 7: Branch attitude



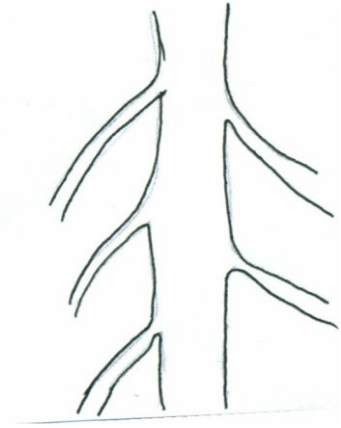
Horizontal

(3)



Angular

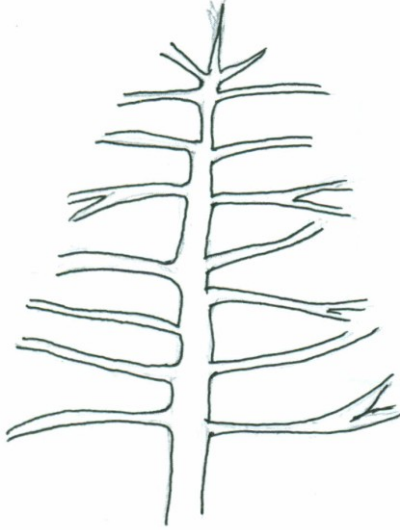
(5)



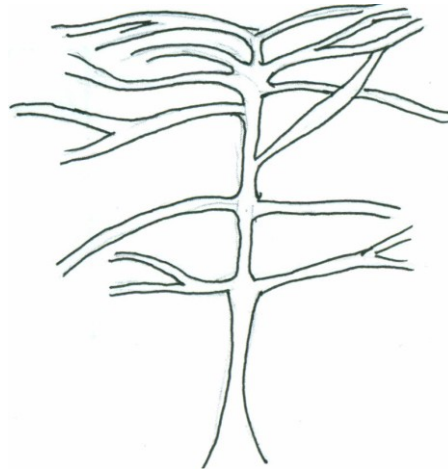
Drooping

(7)

Characteristic 8: Crown Shape

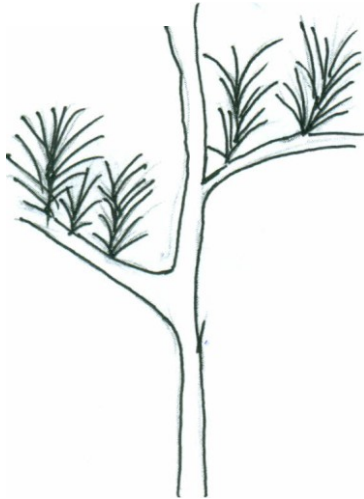


(3)
Conical

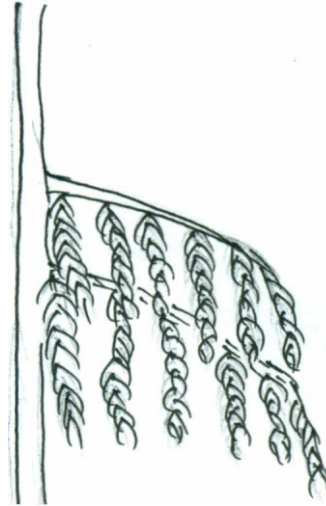


(7)
Flattened

Characteristic 9: Needle attitude



(3)
Erect



(7)
Drooping

Chlorophyll estimation: Estimation of chlorophyll was done according to Arnon (1949) using 80 % Acetone at 645, 663 and 652 nm wavelength

References:

Arnon, D.I (1949). *Plant Physiol.* **24** 1

IX. Working group details

The test guidelines developed by the task force (01/2013) constituted by the PPV & FR Authority for *Cedrus deodara (Roxb.)* with consultation by Himalayan Forestry Research Institute, ICFRE, Conifer Campus, Shimla Technical inputs also provided by the PPV & FR Authority and nodal officer.

The members of the Task Force

- | | |
|---|-----------------------------|
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Secretary |

X. DUS testing centers

Nodal DUS test centre	Co nodal DUS Test Center
Himalayan Forest Research Institute ICFR&E, Conifer Campus Panthaghati, Shimla-171013, HP	_____