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

Chir pine

(Pinus roxburghii) Sargent

Protection of Plant varieties and Farmer's Rights Authority

(PPV & FRA)
Government of India

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Chir pine *(Pinus roxburghii) Sargent*

I. Subject

These test guidelines will apply to all populations/provenances of Chir pine (***Pinus roxburghii***) Sargent.

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 Horticulral 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 colour (Characteristic 11)
2. Needle length (Characteristic 10)
3. Branch attitude (Characteristic 8)
4. Crown shape (Characteristic 9)
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	A. Plant	State	Notes	Populations/provenance	Type of Assessment
1. (*) (QN)	Tree height (m)	Small (up to 20) Medium (21-30) Tall (>30)	3 5 7	Ghanati/Obta Chhabal/Banethi Platu/Kopra	MG/MS
2. (*) (QN)	Diameter at breast height (cm)	Small (up to 40) Medium (40-60) Large (>60)	3 5 7	Malan/Ghanati Chhabal/Banethi Dibkan/Platu	MG/MS
3. (*) (QN)	Clear bole length (m)	Short (< 10) Medium (10-15) Tall (16-20) Very Tal (>20)	3 5 7 9	Banethi/Nihari Chalsai/Surkhigala Dibkan/Bijar Platu/Kopra	MG/MS
4. (*) (QN)	Self Pruning ability(m)	Low (up to 10) Medium (10-20) High (>20)	3 5 7	Banethi/Malan Chhabal/Shimla Platu/Kopra	VG/MS
5. (*) (QL)	Bark colour	Grey Pinkish Brown Orange Brown Dark Brown	1 3 4 5	Nihari/Chalsai Dibkan/Banethi Platu/Shimla Kopra/Bairkot	VS
6. (+) (QL)	Bark pattern	Smooth, shallow fissures Small, deep fissures Longitudinal shallow fissures Longitudinal deep fissure	1 2 4 5	Platu/Kopra Nihari/Chhabal Surkhigala/Bijar Obta/Dibkan	VS
7. (QN)	Bark thickness (cm)	Thin (<0.5) Moderate (0.5 – 1.5) Thick (>1.5)	3 5 7	Kopra/Dibkan Chalsai/Banethi Platu/Bijar	MG/MS
8. (+) (QL)	Branch : attitude	Horizontal Angular	3 7	Kopra/Dibkan Solan/Nihari	VS
9. (*) (+) (QL)	Crown shape	Conical Round Umbrella	1 3 5	Platu/Kopra Dibkan/Banethi Chabbal/Chalsai	VG/VS
10. (*) (QN)	Needle length (cm)	Small (up to 20) Medium (20-35) Large (>30)	3 5 7	Dibkan/Obta Nihari/Chalsai Platu/Bijar	MS
11. (*) (QL)	Needle colour	Light Green Green Yellowish green Dark Green	1 2 3 4	Chalsai/Nihari Ghanati/Obta Bindraban Platu/Kopra	VG/VS
12. (+) (QN)	Chlorophyll content (mg/g)	Low (< 1) Medium (1-1.5) High (> 1.5)	3 5 7	Surkhigala/Banethi Nihari/Chalsai Kopra/Platu	MS
13. (*) (QN)	Cone length (cm)	Small (<10) Medium (10-15) Large (>15)	3 5 7	Banethi/Dibkan Nihari/Chalsai Kopra/Platu	MS
14. (*) (QN)	Cone width (cm)	Small (<5) Medium (6-8) Large (>8)	3 5 7	Obta/Chalsai Bindraban/Baenthi Chhabal/Dibkan	MS
15 (*)	Cone length: breadth ratio	Small Medium	3 5	Chalsai/Nihari Chhabal/Dibkan	MS

(QN)		Large	7	Platu/Banethi	
16. (QN)	No. of seeds per/cone	Low (<45) Medium (46-70) High (>70)	3 5 7	Banethi/Obta Chalsai/kopra Dibkan/Platu	MS
17. (QN)	Bending: Maximum load	Low (<200 Kgf) Medium (200-300 Kgf) High (>300 Kgf)	3 5 7	Malan/Ghanati Chalsai/Banethi Platu/Dindraban	MS
18 (QN)	Strength	Low (<200 Kgf) Medium (200-400 Kgf) High (>400 Kgf)	3 5 7	Chhabal/Ghanati Kopra/Banethi Platu/Bindraban	MS

VIII. Explanation for the Table of characteristics

Characteristic 1: Tree height (m)

Small (up to 20)

(3)

Medium (21-30)

(5)

Tall (> 30)

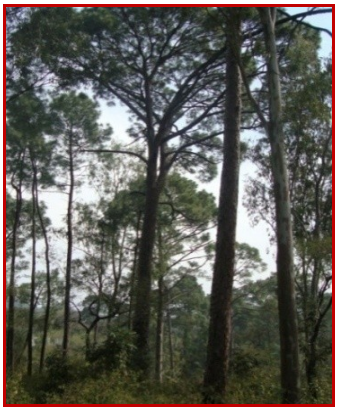
(7)

Characteristic 2: Diameter at Breast Height (cm)

Small (up to 40)

(3)

Medium (40-60)



(5)

Large (>60)

(7)

Characteristic 3: Clear bole length (m)

Short (<10)

(3)

Medium (10-15)

(5)

Tall (16-20)

(7)

Very Tall (>20)

(9)

Characteristic 4: Self Pruning ability

Low (up to 10)

(3)

Medium (10-20)

(5)

High (>20)

(7)

Characteristic 5: Bark Colour

Grey

(1)

Pinkish Brown

(3)

Orange Brown

(4)

Dark Brown

(5)

Characteristic 6: Bark pattern

Smooth, shallow fissures

(1)

Small, deep fissures

(2)

Longitudinal shallow fissures

(4)

Longitudinal deep fissures

(5)

Characteristic 8: Branch attitude

Horizontal

(3)

Angular

(7)

Characteristic 9: Crown shape

Conical

(1)

Round

(3)

Umbrella

(5)

Characteristic 11: Needle colour

Light Green

(1)

Green

(2)

Yellowish Green

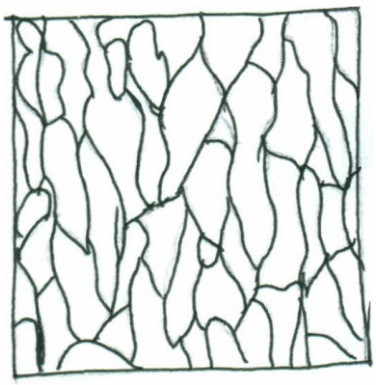
(3)

Dark Green

(4)

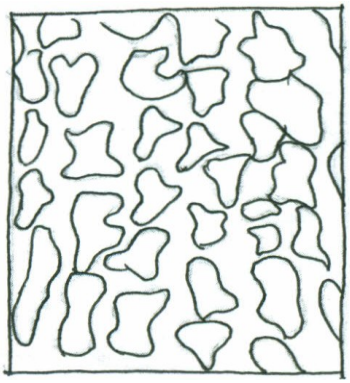
VIII. Explaination for the Table of Characteristics

Characteristic 6: Bark pattern



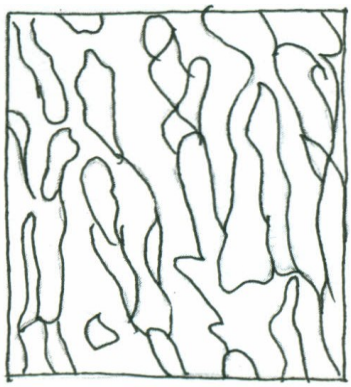
(1)

Smooth shallow fissures



(2)

Small deep fissures



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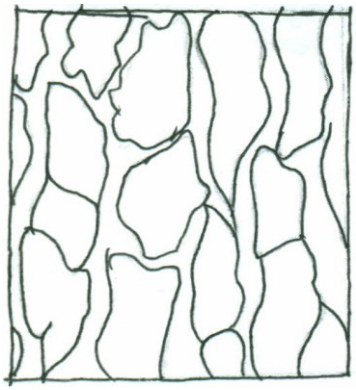
Longitudinal shallow fissures



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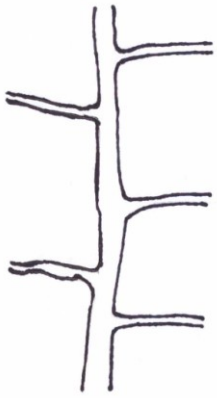
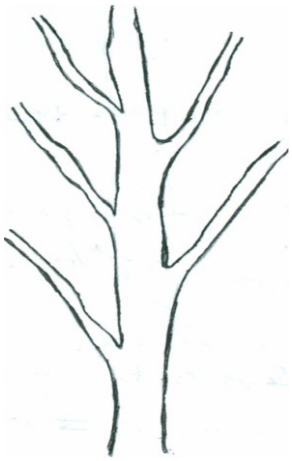
Longitudinal deep fissures

Characteristic 8: Branch attitude



(3)

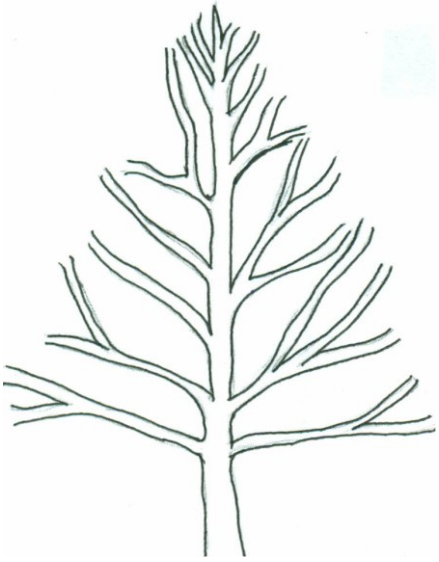
Horizontal



(7)

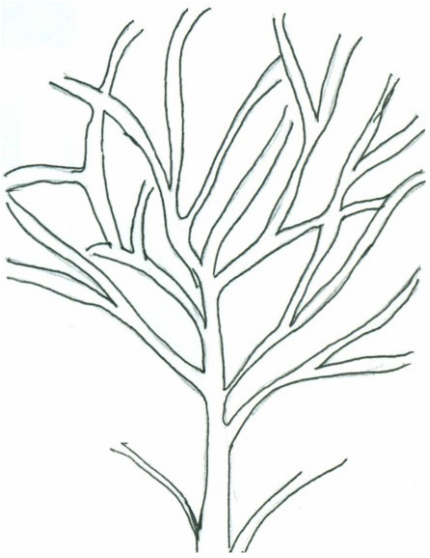
Angular

Characteristic 9: Crown shape



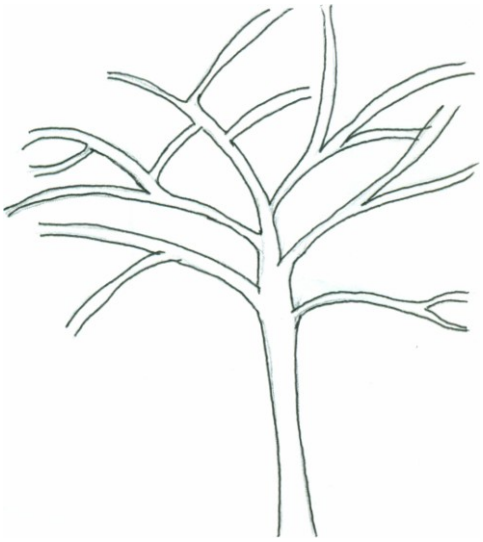
(1)

Conical



(3)

Round



(5)

Umbrella

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 ***Pinus roxburghii*** **Sargent** with consultation by Himalayan Forestry Research Institute, ICFRE, Conifer Campus, Shimla Technical inputs also provided by the PPV & FR Authority and nodal officer.

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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	———