

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

On

Tea

(*Camellia sinensis*, *C. assamica* & *C. assamica ssp lasiocalyx*)

Protection of Plant Varieties and Farmers Rights' Authority
(PPV & FRA)
Government of India

Tea (*Camellia sinensis*, *C. assamica* & *C. assamica ssp lasiocalyx*.)

I Subject

These Test Guidelines shall apply to all varieties of Tea (*Camellia sinensis*, *C. assamica* & *C. assamica ssp lasiocalyx*)

II Plant material required

The Protection of Plant Varieties & Farmers' Rights Authority (PPV&FRA) shall decide when, where and in what quantity and quality of the plant material are required for testing of the variety denomination applied for registration under the Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2001. Applicants submitting such material from a country other than India shall make sure that all customs and quarantine requirements stipulated under relevant national legislations are complied with the minimum quantity of plant material to be supplied by the applicant shall be 75 plants.

1. The material is to be supplied in the form of nine months to one year old (of 15-18 inches height) young plants having pencil thick stem with their own roots.
2. The plant material supplied shall be healthy, not lacking in vigor or affected by any important pest or disease.
3. The plant material shall not have undergone any chemical or bio-physical treatment, unless the competent authority allows or request for such treatment. If it has been treated, full details of the treatment must be given.

III Conduct of tests

1. The minimum duration of the DUS test shall normally be two years.
2. The test shall normally be conducted at two test locations. If any essential characteristics of the candidate variety are not expressed for visual observation at two locations, the variety shall be considered for further examination at another appropriate test site or under special test protocol on expressed request of the applicant.
3. The field tests shall be carried out under conditions favouring normal growth and expression of all test characteristics. The size of the plots shall be such that plants or parts of plants

could be removed for measurement and observation without prejudicing the other observation on the standing plants until the end of the growing period.

4. In particular, growth regulators should not be used.
5. The test plot design shall be as follows
 - Planting design : Single hedge system
 - Plant spacing : 75 X 75 cm for south India
110 x 75 cm for plains of north India
90 X 45 cm for the hills of Darjeeling
 - Plants / replication : 20
 - Number of replication : Two
 - Total number of plants : 40
6. Additional test protocols for special purpose shall be established by the PPV&FR Authority

IV. Methods and observations

1. The characteristics described in the Table of characteristics (See Section-VII) shall be used for the testing of varieties for their DUS.
2. For the assessment of Distinctiveness and Stability, observations shall be made on 10 plants or parts of 10 plants, which shall be equally divided among 2 replications.
3. For the assessment of Uniformity of vegetatively propagated varieties, a population standard of 1% and an acceptance of probability of at least 95% shall be applied.
4. All observations on mature leaf characters shall be made on the 5th leaf from the tip.
5. All observations on young leaf characters shall be made on the 2nd leaf of a two leaf and a bud shoot.
6. Observations on pubescence to be taken on the unopened bud and the pigmentation on the first leaf.
7. For the assessment of colour characteristics, the latest Royal Horticultural Society (RHS) colour chart shall be used.

V. Grouping of varieties

1. The candidate varieties for DUS testing should 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 variety and which in their various states are fairly distributed evenly across all varieties in the collection, are suitable for grouping purposes.

2. The following characteristics shall be used for grouping of tea varieties
 - a) Leaf shape (Characteristic 5)
 - b) Leaf apex (Characteristic 8)
 - c) Leaf base (Characteristic 9)
 - d) Leaf margin (Characteristics 10)

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 used to describe the state of each character for the purpose of digital data processing and these notes shall be given against the states of the different characteristics. .

3. Legend

(*) Characteristics that shall be observed during the active growing season and shall always be included in the description of the variety, except when the state of expression of any of these characters is rendered impossible by a preceding phenological characteristic or by the environmental conditions of the testing regions. Under such situation, adequate explanation shall be provided.

(+) See explanations for the Table of characteristics in section VIII. It is noted that for certain characteristics the plant parts on which observations to be taken are given in the explanation of figure (s) for clarity and not for the colour variation.

4. Type of assessment of characteristics indicated in column 7th of Table of characteristics in section VII is as follows.

Code for growth stage

Code	Growth stage
45	Mature tea (>5 years)
68	Fully developed flower

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.

VII. Table of characteristics

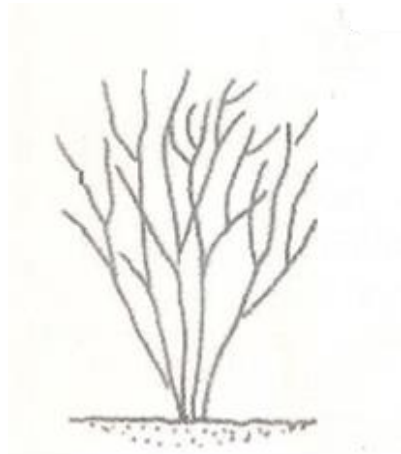
S.No	Characteristics	States	Note	Example Variety	Stage of observation	Types of assessment
1. (+) (*)	Growth habit	Erect Semi erect Horizontal	3 5 7	TV7,UPASI-1, TV23, UPASI-17 TV29, TRF-1	45	VG
2 (*) (+)	Young leaf colour	Yellow green Dark green Purple green	2 7 9	TV 13, UPASI-17, AV-2 TV1, UPASI-9, P 312	45	VG
3. (+) (*)	Mature leaf colour	Dark green Yellow green	2 7	TV 9, UPASI-1, P312 TV 30, UPASI-17, AV 2	45	VG
4. (*)	Petiole: Anthocyanin pigmentation	Absent Present	1 9	TV2, UPASI-9 TV18, TRF-1	45	VG
5. (+) (**)	Leaf shape	Lanceolate Elliptic Ovate	3 5 7	TV7, UPASI-9, T- 78 TV31, UPASI-2, HV-39 TV5, UPASI-22, B-157	45	VG
6 (+) (*)	Leaf size (Length & Breadth ratio)	Small (<2.75) Medium (2.75-3.25) Large (>3.25)	3 5 7	TV7, UPASI-10, T 78 TV23, UPASI-9, HV 39 TV10, UPASI-3, B-157	45	VG/MS
7. (+) (*)	Leaf upper surface: Bullation	Absent Present	1 9	TV31, UPASI-17, HV-39 TV3, UPASI-9, B- 157	45	VG
8. (+) (*)	Leaf apex	Acute Acuminate	1 5	TV4, UPASI-26, AV-2 TV6, UPASI-9, B - 157	45	VG

9. (+) (*)	Leaf base	Attenuate Obtuse	1 9	TV 20, UPASI-9, T-78 TV 13, UPASI-26, B-157	45	VG
10. (*) (+)	Leaf margin	Serrate Biserrate Blunt	1 5 9	TV 17, UPASI—9, AV 2 TV 20, UPASI-11, P312 TV30, UPASI-26, NA	45	VG
11. (*) (+)	Leaf blade attitude.	Erect Semi erect Horizontal	3 5 7	TV 7, UPASI-1, AV-2 TV1, UPASI-17, B-157 TV 29, TRF 1, NA	45	MG
12. (*) (+)	Leaf pubescence: Density	Sparse Medium Dense	3 5 7	TV 27, UPASI-9, AV-2 TV 2, UPASI-22, TTV-1	45	VG
13 (*) (+)	Position of stigma in relation to stamen	Introse Co-planner Extrose	1 3 5	TV 22, UPASI-22 TV 10, TRF 4 TV 12	68	VG
14. (*) (+)	Position of Style splitting	Geniculate Ascending United	1 2 3	TV 4, TRF-4 TV 17, TRF-1	68	VG
15 (*)	Flower colour of inner petals	White Pale yellow Light pink	2 5 7		68	VG
16 (*) (+)	Flower diameter	Small Medium Large	3 5 7	19/58/4,TV 17, UPASI—26 CB/38,TV 10, UPASI-9 UPASI-20	68	VG
17 (*)	Flushing behaviour	Early Medium Late Prolong	1 2 3 4	TV 9, DP 36 TV 22 TV 18 TV 9,TV 20	45	VG
18. (*) (+)	Leaf blade: shape in cross section	Folded upward Flat Recurved	1 2 3	TV 17 TV12 -	45	VG
19. (*) (+)	Branch Zigzaging	Absent Present	1 9	TV5 TV 27	45	VG

20. (* (+)	Leaf blade: undulation of leaf edges	Absent/week Medium Strong	1 2 3	TV 19 TV 22 TV 9	45	VG
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VIII. Explanation on the table of characteristics

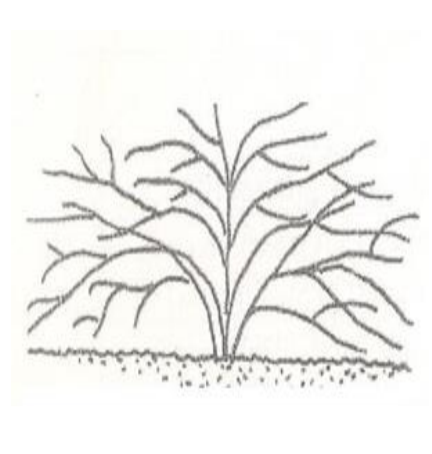
Characteristic 1: Growth: Habit



**3
Erect**



**5
Semi erect**



**7
Horizontal**

Characteristic 2: young leaf colour



**2
Yellow green**



**7
Dark green**



**9
Purple green**

Characteristic 3: Mature Leaf colour

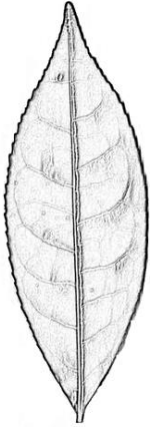


**2
Dark green**

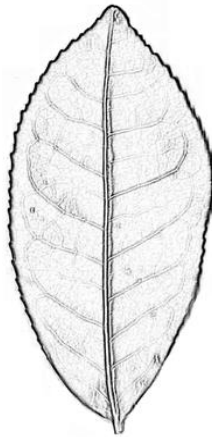


**7
Yellow green**

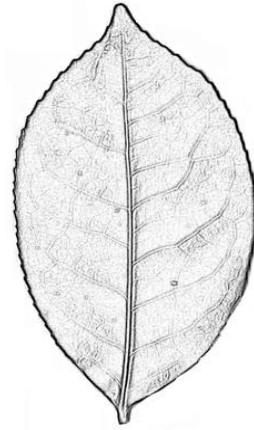
Characteristic 5: Leaf: Shape



3
Lanceolate

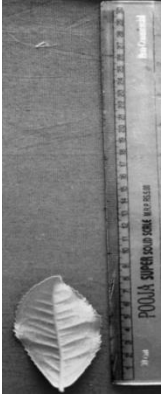


5
Elliptic



7
Ovate

Characteristic 6: Leaf size



3
Small



5
Medium



7
Large

Characteristic 7: Leaf: Upper surface:

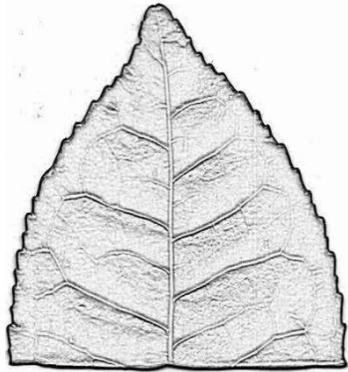


1
Absent

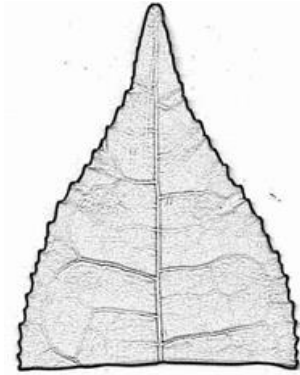


9
Present

Characteristic 8: Leaf: Apex

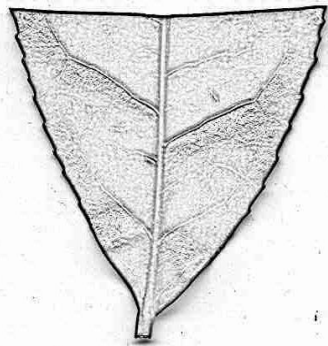


1
Acute

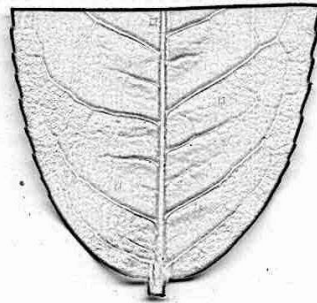


5
Acuminate

Characteristic 9: Leaf: Base



1
Attenuate



9
Obtuse

Characteristic 10: Leaf: Margin



1
Serrate



5
Biserrate



9
Blunt

Characteristic 11: Leaf Blade attitude



3
Erect

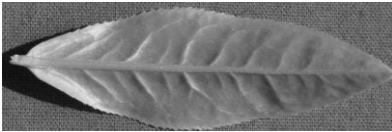


5
Semi erect



7
Horizontal

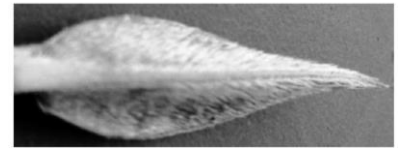
Characteristic 12: Leaf Pubescence



3
Sparse

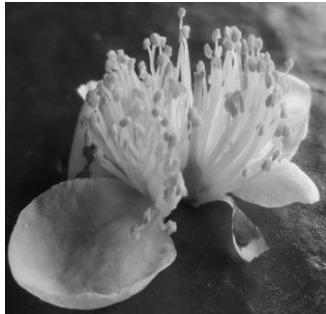


5
Medium



7
Dense

Characteristics 13: Position of stigma in relation to stamen



1
Introse

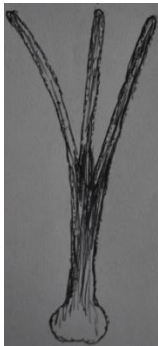


3
Co-planner



5
Extrose

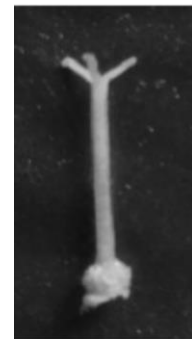
Characteristics 14: Position of style splitting



1
Geniculate



2
Ascending

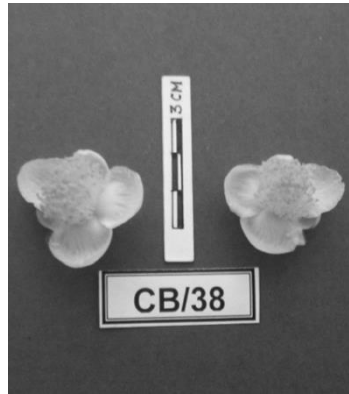


3
United

Characteristics 16: Flower diameter



**3
Small**



**5
Medium**



**7
Large**

Characteristics 18: Leaf blade : Shape in cross section



**1
Folded upward**



**2
Flat**



**3
Recurved**

Characteristics 19: Branch zigzagging



**1
Absent**

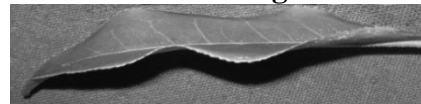


**9
Present**

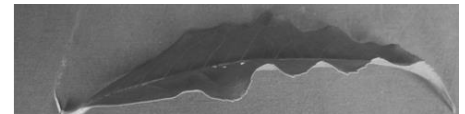
Characteristics 20: Leaf blade: undulation of leaf edges



**1
Absent**



**2
Medium**



**3
Strong**

IX. Working group details

The test guideline developed by Tea Research Association, Jorhat, Assam under the Chairmanship of Director, TRA, Jorhat and Director, UPASI, Tea Research Foundation, Tea Research Institute, Valparai-642127, Tamilnadu and Project Director, Darjeeling Tea Research & Development centre, Tea Board of India, Kurseong-734 203, Darjeeling, West Bengal. The suggestions and technical inputs were provided by the following members of task force (2/2012) constituted by the PPV & FR Authority in development & finalization of this DUS test guidelines.

X DUS testing centers

Nodal DUS test center	Other (Co-nodal) DUS Test centers
Tocklai Experimental Station, Tea Research Association, Jorhat-785 008, Assam.	UPASI Tea Research Foundation, Tea Research Institute, Valparai-642127, Tamilnadu. Darjeeling Tea Research & Development Centre, Tea Board of India, Kurseong-734 203, Darjeeling, West Bengal.

The Members of the Task Force Committee

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