

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

CHINA ASTER [*Callistephus chinensis* (L.) Nees.]



Protection of Plant varieties and Farmer's Rights Authority

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

CHINA ASTER [*Callistephus chinensis* (L.) Nees.]

I. Subject

These Test Guidelines shall apply to all varieties of *Callistephus chinensis* (L.) Nees.

II. Plant Material Required

1. The Protection of Plant Varieties & Farmers Rights' Authority (PPV&FRA) shall decide when, where and in what quantity the seeds are required for testing of a variety denomination for registration under the Protection of Plant Varieties and Farmers' Rights (PPV&FRA) 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 legislation and regulations are complied with.
2. The material is to be supplied in the form of seed. The minimum quantity of freshly harvested seed, to be supplied by the applicant should be 2 g each in two packets. The seed should have 98% purity, 6-9% moisture content and 60% germination.
3. The seed supplied should be healthy, neither lacking in vigor, nor affected by any pest or diseases.
4. The seed should not have undergone any treatment which would affect the expression of the characteristics of the variety, 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

1. The minimum duration of tests shall be at least two similar growing seasons at two locations. If distinctiveness cannot be sufficiently established in these growing periods, the test should be extended for an additional growing period.
2. The field tests shall be carried out under conditions ensuring normal growth and expression of all test characteristics. The size of the plot should be 2.7 m x 1.2 m and plants are planted at spacing of 30 cm x 30 cm.
3. In particular, growth regulators should not be used. Planting should be taken in regular *rabi* (winter) season.
4. Thirty days old seedlings can be used for transplanting in main DUS test plot.

IV. Methods and observations

1. The characteristics described in the Table of characteristics shall be used for the testing of varieties for their DUS (section VII).
2. The assessment of the characteristics should be at the optimum stage of development i.e. at full flowering.
3. All observations on vegetative parts shall be recorded on the one third portion from the base of the plant. Colour of vegetative parts shall be observed on plants exposed to natural light. All observations on the leaf should be made on leaves at the base of the lowest flowering branch.
4. All observations on floral parts shall be made on terminal flower heads. The colour of the ray florets shall be recorded at full open stage. Time of beginning of flowering is when the first flower head has fully opened on 50% of the plants.
5. All observations on 10 single plants or parts taken from 10 plants and any other observations made on all plants in the test.
6. Each test shall include a total of at least 64 plants in two replications. For assessment of Distinctiveness and Stability, all observations shall be made on all plants. No statistical analysis is required for these tests.
7. For the assessment of colour characteristics, the latest Royal Horticultural Society (RHS) colour chart shall be used.
8. Additional tests protocols for special purpose shall be established by the PPV& FR Authority.
9. Standard cultural practices to be adopted and specified as may be relevant to the location of the DUS test centres. The DUS test centres shall finalize the standard cultural practices with the approval of the Authority.
10. System for growth stages in China aster

Code	Growth Stages
01	When the first flower head has fully opened on 50% of the plants
02	When the plants are in full flowering
03	When the outer row of the disc florets show pollen
04	When 50 per cent the disc florets opened

V. Grouping of Varieties

1. The candidate varieties for DUS testing shall be divided into groups to facilitate the assessment of Distinctiveness. Characteristics and their states which are known from experience not to vary or to vary only slightly within a variety are suitable for grouping purpose.
2. The following characteristics shall be used for grouping China aster varieties:
 1. Plant: height: Short, medium, tall (characteristic 1)
 2. Plant type: Erect, semi-erect and spreading (characteristic 2)
 3. Flower head diameter: Small, medium and large (characteristic 12)
 4. Ray floret in outer rows: shape - pointed and blunt (characteristic 16)
 5. Ray floret in outer rows: colour of inner side (characteristic 18)
 6. Type of flower head: Semi-double (flower head with visible disc florets) and Powderpuff type (flower head with prominent disc florets) (characteristic 21)

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 (1-9) shall be used to describe the state of each character for the purpose of digital data processing.
3. Legend
 - (*) Characteristics that shall be observed during every growing season on all varieties and shall always be included in the description of the variety.
 - (+) See explanations on the Table of characteristics.
4. Characteristics denoted with symbols QL, QN and PQ in first column of the Table of characteristics shall be indicated as:
 - QL:** Qualitative characteristic
 - QN:** Quantitative characteristic
 - PQ:** Pseudo-qualitative characteristic
5. Type of assessment of characteristics indicated in column no. seventh of the 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 observations of individual plants or parts of plants

VII. Table of characteristics

Sl. No.	Characteristics	States	Notes	Stage of observation	Example varieties	Type of assessment
1. (* QN	Plant: height (cm)	Short (20-40cm)	3	01	Matsumoto Red	MS
		Medium (>40 to 60 cm)	5		Kamini, Poornima	
		Tall (>60cm)	7		PG Pink, PG Violet, PG Purple	
2. (* QN (+)	Plant: type	Erect	3	01	Kamini	VG
		Semi-erect	5		Poornima, PG Purple	
		Spreading	7		PG Violet, Arka Archana	
3. QN	Stem: thickness	Thin (<25 mm)	3	01	Matsumoto Sacrlet	MS
		Medium (>25 mm to 35 mm)	5		Kamini, PG Pink	
		Thick (>35 mm)	7		PG White, Shashank	
4. PQ (+)	Density of branches	Sparse	3	02	Poornima	VG
		Medium	5		Violet Cushion	
		Dense	7		Local Violet	
5. (* QL	Stem: anthocyanin colouration of internode	Absent	1	01	Poornima, Shashank	VS
		Present	9		Kamini, Local Violet	
6. (* QL (+)	Leaf: shape	Linear	3	01	-	VS
		Elliptic	5		Matsumoto White	
		Ovate	7		Kamini	
7. PQ	Leaf: area	Small	3	01	Shashank	VS
		Medium	5		Violet Cushion	
		Large	7		Poornima, PG White	
8. (* QL (+)	Leaf: dentations	Absent	1	01	-	VS
		Present	9		Kamini	
9. (* PQ	Leaf: intensity of green colour	Light	3	02	Shashank	VS
		Medium	5		Matsumoto White, Poornima	
		Dark	7		Kamini	
10. (* PQ	Leaf midrib: pigmentation	Absent	1	02	Poornima, Shashank	VS
		Present	9		Kamini	
11.	Flower head: number of	One	3	03	Single Local	MS

(*) PQ	whorls of ray florets	Two to three	5		Local Pink	
		More than three	7		Kamini	
12. (*) QN	Flower head: diameter	Small (<4 cm)	3	03	Matsumoto Red, Matsumoto Pink	MS
		Medium (>4 cm to 5 cm)	5		Kamini, Shashank	
		Large (>5 cm)	7		Poornima, PG Pink	
13. (*) QN	Ray floret: length (outer row)	Short (<2 cm)	3	03	Matsumoto Red, Matsumoto Rose	MS
		Medium (>2 cm to 3 cm)	5		Poornima	
		Long (>3 cm)	7		PG Pink, PG White	
14. (*) QL (+)	Ray floret: shape	Narrow	3	03	Local Violet	VS
		Broad	5		Poornima, PG Pink	
15. (*) PQ	Ray floret: arrangement	Semi-upright	3	03	Kamini	VS
		Horizontal	5		Poornima	
		Reflexed	7		-	
16. (*) QL (+)	Ray floret: shape in cross section	Concave	3	03	Matsumoto White	VS
		Straight	5		Poornima	
		Convex	7		-	
17. (*) PQ (+)	Ray floret: shape at tip	Pointed	3	03	Local Violet	VS
		Blunt	5		Poornima	
18. (*) QL	Ray floret: colour of inner side	RHS colour chart (indicate reference number)	-	03	-	VS
19. (*) QL	Disc floret: colour of corolla lobe (RHS)	White	1	04	Poornima	VS
		Yellow	3		Local Violet	
		Purple	7		Violet Cushion	
20. (*) QN	Days to first flower opening	Early (60 to70)	1	01	Matsumoto Red	MG
		Medium (>70 to 80)	3		Shashank, Poornima	
		Late (>80)	5		Kamini, PG White	
21. (*) QN	Flower head: type	Semi-double	3		Kamini, PG Pink	VS
		Powderpuff	5		Poornima, Violet Cushion	

VIII. Explanation on the table of characters

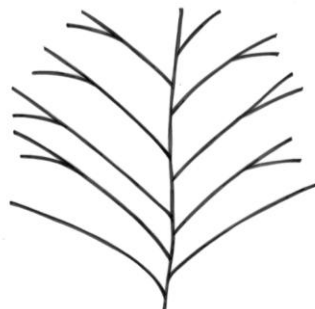
Characteristic 2. Plant: type



Erect



Semi-erect



Spreading

Characteristic 4. Density of branches



Sparse



Medium



Dense

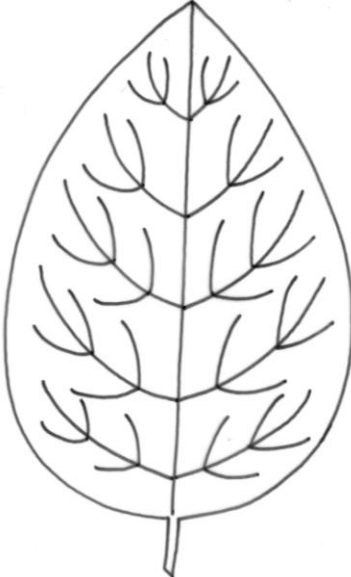
Characteristic 6. Leaf: shape



Linear

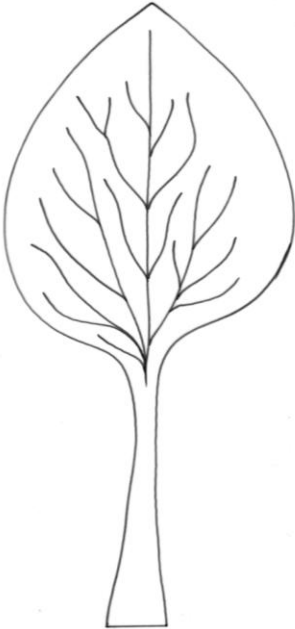


Elliptic

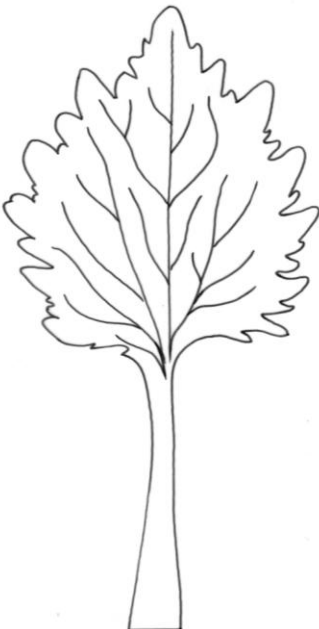


Ovate

Characteristic 8. Leaf: dentations



Absent



Present

Characteristic 14. Ray floret: shape



Narrow

Broad

Characteristic 16. Ray floret: shape in cross section

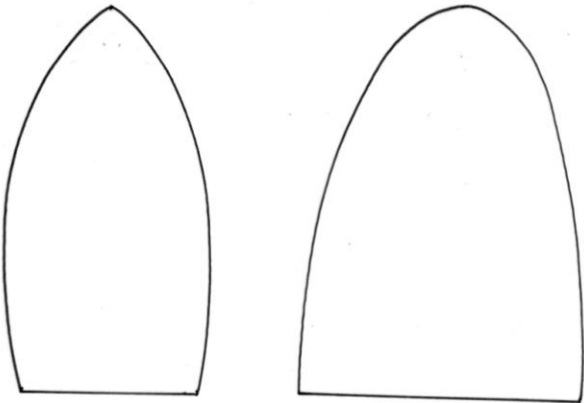


Concave

Straight

Convex

Characteristic 17. Ray floret: shape at tip



Pointed

Blunt

IX. Working Group Details

These test guidelines developed by Task Force (3/2013) constituted by PPV & FRA, New Delhi under the chairmanship of Dr. T. Manjunatha Rao, Principal Scientist (Horticulture) & Head , Division Of Ornamental Crops , Indian Institute Of Horticultural Research , Hesaraghatta Lake Post, Bangalore , Dr. Rajiv Kumar, Senior Scientist (Horticulture) and Nodel Officer, IIHR, Bangalore, Dr. S. M. Katwate, Geneticist, Principal Investigator and Co-Nodal Centre , National Agriculture Research Project, Ganeshkhind, Pune and technical inputs were also provided by the Officials of PPV&FRA for finalization of this guideline.

Members of the Task Force (3/3013)

Dr. T. Manjunatha Rao, Principal Scientist (Horticulture) & Head, Division of Ornamental Crops, IIHR, Bangalore	Chairman
Dr. Rajiv Kumar, Senior Scientist (Horticulture), Principal Investigator and Nodal Centre IIHR, Hesaraghatta, Bangalore	Member
Dr. S. M. Katwate, Geneticist, Principal Investigator and Co-Nodal Centre National Agriculture Research Project, Ganeshkhind, Pune - 411 007, Maharashtra	Member
Dr. Manoj Srivastava, Registrar, PPV & FR Authority, New Delhi	Member Secretary

X. Name of DUS Test Centres:

Nodal DUS Centre	Co-Nodal Centre
Dr. Rajiv Kumar Division of Ornamental Crops, Indian Institute of Horticultural Research, Hesaraghatta lake Post, Bangalore 5600 089, Karnataka	Dr. S.M. Katwate National Agriculture Research Project, Ganeshkhind, Pune - 411 007, Maharashtra