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

On

Field pea

(*Pisum sativum* L.)

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

Government of India

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I. Subject

These test guidelines shall apply to all varieties, hybrids and parental lines of Field pea (*Pisum sativum* L.).

II. Seed material required

1. The Protection of Plant Varieties and Farmers' Rights Authority (PPV & FRA) shall decide when, where and in what quantity and quality of the seed material are required for testing a variety denomination applied for registration under the Protection of Plant Variety and Farmers' Rights (PPV & FR) Act, 2001. Applicants submitting such seed 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. The minimum quantity of the seed to be provided by the applicant shall be 2000 gram in the case of the candidate variety. Each of these seed lots shall be packed and sealed in ten equal weighing packets and submitted in one lot.

2. The seed submitted shall have at least 85% germination, 98% physical purity, highest genetic purity, uniformity, sanitary and phyto-sanitary standards. In addition the moisture content of the seed shall not exceed 8 - 9% to meet the safe storage requirement. The applicant shall also submit along with the seed a certified data on germination test made not more than one month prior to the date of submission.

3. The seed material shall not have been subjected to any chemical or bio-physical treatment.

III. Conduct of tests

1. The minimum duration of the DUS tests shall normally be at least two independent similar growing seasons.

2. The test shall normally be conducted at least at two test locations. If any essential characteristics of the candidate variety are not expressed for visual observation at these 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 observations on the standing plants until the end of the growing period. Each test shall include about 350 plants, in the plot size and planting space specified below across three replications. Separate plots for observation and measurement can only be used if they have been subjected to similar environmental conditions. All the replications shall be sharing similar environmental conditions of the test location.

4. **Test plot design:**

Number of rows	:	5
Row length	:	5 m
Row to row distance	:	60 cm (determinate types)
		90 cm (indeterminate types)
Plant to plant distance	:	20 cm
Expected plants / replication	:	125
Number of replications	:	3

5. Observations shall not be recorded on plants in border rows.

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, inbred lines and hybrids for their DUS.

2. For the assessment of Distinctiveness, and Stability observations shall be made on 30 plants or parts of 30 plants, which shall be equally divided among 3 replications (10 plants per replication).

3. For the assessment of Uniformity of characteristics on the plot as a whole (visual assessment by a single observation of a group of plants or parts of plants), a population standard of 0.5% with an acceptance probability of at least 95% shall be applied. In the case of a sample size of 300 plants, the number of off-types shall not exceed 4.

4. For the assessment of all colour characteristics, the latest Royal Horticultural Society (RHS) colour chart shall be used.

V. Grouping of varieties

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

2. The following characteristics are proposed to be used for grouping field pea varieties:

a)	Plant	:	Height (Characteristic 14)
b)	Stipule	:	Rabbit-eared stipules (Characteristic 6)
c)	Flower	:	Opening (days) (Characteristic 8)
d)	Pod	:	Shape of the distal part (Characteristic 12)

e) Seed : Cotyledon colour (Characteristic 17

f) Seed : Shape (Characteristic 15)

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. Note (1 to 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, 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 region. Under such exceptional situation, adequate explanation shall be provided.

(+) 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 figure(s) for clarity and not the colour variation.

4. The optimum stage of plant growth for assessment of each characteristic is given in the sixth column of Table of characteristics.

5. Type of assessment of characteristics indicated in column seven 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	States	Note	Example varieties	Stage of observation	Type of assessment
1	2	3	4	5	6	7
1. (*)	Stem: Anthocyanin colouration	Absent	1	HFP 4, Rachna	Initiation of first flower	VS
		Present	9	---		
2. (*)	Foliage: Colour	Light green	3	Rachna, HUP 2	Initiation of first flower	VG
		Green	5	HUDP 15, HFP 8909		
		Dark green	7	VL 3, B 22		
3. (*)	Foliage: Waxy bloom	Absent	1	---	Initiation of first flower	VG
		Present	9	HFP 4, HFP 8909, KPMR 400		
4. (*)	Leaf: Leaflets	Absent (afila type)	1	HUDP 15, HFP 4	Initiation of first flower	VG
		Present	9	Rachna, IPF 99-25		
5.	Leaf: Axil colour	Green	1	HUDP 15, Rachna	Initiation of first flower	VS
		Purple	2	B 22		
6. (*) (+)	Stipule: Rabbit-eared stipules	Absent	1	DDR 23, B 22	Initiation of first flower	VG
		Present	9	Rachna, HUDP 15		
7.	Stipule: Type	Normal	1	Rachna, DMR 7	initiation of first flower	VG
		Vestigial	3	---		
8. (*)	Flower: Opening (days)	Extra early (<40)	1	Arkel, NDVP 24	50% of the plants with at least one open flower)	VG
		Early (40-50)	2	DDR 23		
		Medium (51-70)	3	HUDP 15, HFP 8909		
		Late (> 70)	4	---		

9.	Flower: Standard petal colour	White Blue Pink Red Purple	1 2 3 4 5	HUDP 15, HFP 4, Bonneville --- --- --- B 22	50% flowering	VG
10. (*)	Pod : Number / Axil	Single Double Multiple	1 2 3	Arka Ajit HUDP 15, Rachna ---	Fully developed green pod	VS
11. (*) (+)	Pod: Curvature	Absent Weak Medium Strong	1 3 5 7	--- --- Rachna, KFP 103 ---	Fully developed green pod	VG
12. (*) (+)	Pod: Shape of distal part	Pointed Blunt	1 9	HFP 4, Rachna ---	Fully developed green pod	VS
13.	Pod: Intensity of green colour	Light green Green Dark green	3 5 7	VL3 HFP 8909, DMR 7, Arkel HUDP 15, IPFD 99-13	Fully developed green pod	VG
14. (*)	Plant: Height	Short (< 60 cm) Medium (60-80 cm) Long (> 80 cm)	3 5 7	HFP 4, KPMR 400 HUDP 15, Azad pea 1 Rachna, KFP 103	Peak flowering	MS
15. (*) (+)	Seed: Shape	Spherical Cylindrical Dimpled	1 2 3	HFP 4, Rachna --- ---	Mature seed	VG

16. (+)	Seed: Surface	Smooth Wrinkled	1 2	HUDP 15, Rachna Arkel Azad pea 1	Mature seed	VG
17. (*)	Seed: Cotyledon colour	Creamy Green Yellow	3 5 7	HUDP 15, HFP 4 HFP 9907 B ---	Mature seed	VG
18.	Seed: Weight of 1000 seeds	Small (<150 g) Medium (150-200 g) Large (> 200g)	3 5 7	B 22 --- Rachna, Jayanti	Mature seed	MG
19.	Seed: Testa mottling	Absent Present	1 9	HUDP 15, Rachna ---	Mature seed	VG
20.	Seed parchment	Absent Present	1 9	HUDP 15, Rachna ---	Fully developed green pod	VG

VIII. Explanation for the table of characteristics

Characteristic 6. Stipule: Rabbit-eared stipules

1
Absent

9
Present

Characteristic 11. Pod: Curvature

1
Absent

3
Weak

5
Medium

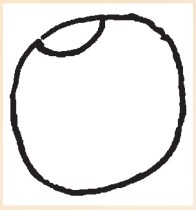
7
Strong

Characteristic 12. Pod: Shape of distal part

1
Pointed

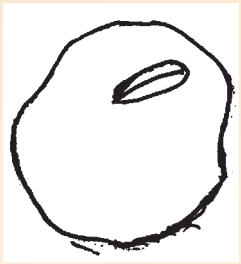
9
Blunt

Characteristic 15. Seed: Shape



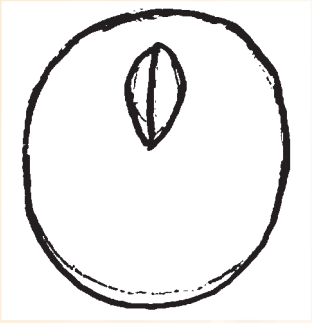
1
Spherical

2
Cylindrical

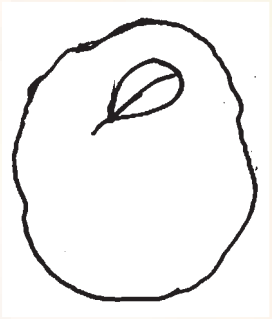


3
Dimpled

Characteristic 16. Seed: Surface



1
Straight



3
Curved

IX. Working Group details

The Test Guideline developed by the National Core Committee in consultation with the Project Co-coordinator MULLaRP, Indian Institute of Pulse Research (IIPR), Kanpur, the Nodal Officer, DUS Testing, IIPR, Kanpur and the Task Force (1/2005) constituted by the PPV & FR Authority

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