

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

On

SEABUCKTHORN
(Hippophae rhamnoides L.)



**Protection of Plant Varieties and Farmers
Rights Authority (PPV&FRA),
Govt. of India, New Delhi**

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SEABUCKTHORN (*Hippophae rhamnoides* L.)

Introduction

Hippophae rhamnoides L. is commonly known as Seabuckthorn, Siberian pineapple, Seaberry, Sandthorn or Sallowthorn. Seabuckthorn (*Hippophae* spp. L.) is an ecologically and economically important thorny shrub that belongs to the family Elaeagnaceae and locally known as *Chharma*, *Sutz*, *Sarla*, in Himachal Pradesh and *tSer-Mang*, *tSer-Sa-Lu-Lu*, *Shib-Shu-Lu-Lu*, *sTar-Bu*, *Amesh*, *Chuk*, *Amil*, *Tarwar* in Leh (UT). The name is from its habit of growing near the sea and from the possession of many spines or thorns that are reminiscent of some buckthorn species



(of the genus *Rhamnus*). The species is a wind pollinated, dioecious shrub/small tree. The female plant bears red, orange or yellow berry on its two-year-old thorny branches. The plant is hardy and it can withstand extreme temperatures from -43°C to 40°C. It is considered to be drought tolerant which is reflected from its form and structure of leaves. The shrub develops extensive root system having ability to fix atmospheric nitrogen. The species has recently been declared as horticultural activity under Mission for Integrated Development of Horticulture (MIDH) scheme of Ministry of Agriculture and Farmers' Welfare, GoI in four Himalayan states (Himachal Pradesh, Uttarakhand, Sikkim and Arunachal) and two Union Territory (Jammu & Kashmir, Ladakh). It is mostly found growing along the hill slopes, riverbeds, water logged and marshy areas and as a biofence around agricultural fields and orchards. It also grows as dense stands in scattered patches on moist areas.

Subject

These Test Guidelines shall apply to all the varieties of Seabuckthorn (*Hippophae rhamnoides* L.), belonging to family Elaeagnaceae.

I. Material Required

1. The Protection of Plant Varieties & Farmers' Rights Authority (PPV&FRA) shall decide when, where and in what quantity and quality the plant material are required for testing of a variety denomination 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 and regulations are complied with.
2. The minimum required quantity of planting material, should be at least seven well rooted one-year-old plants in poly bags with at least two shoots.

3. The planting material supplied shall be healthy, not lacking in vigour or affected by any pest or disease and it should certify that it shall also possess the highest genetic stability in the propagated material and uniformity.
4. The planting material shall not have undergone any chemical or bio-physical treatment, unless the Registrar of the Authority has requested for such treatment. If, it has been treated, full details of the treatment must be provided.
5. The planting material for DUS test should represent populations/provenances and/or individuals within populations/provenances with characteristic features.

II. Conduct of Tests

1. The minimum duration of tests should normally be two independent growing cycles. The growing cycle is considered to be the duration of a single growing season, beginning with bud burst and flowering, where as the fruit harvest only be in females and concluding when the following dormant period ends with the swelling of next season buds.
2. The tests should be conducted normally at one place/location and carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination. In particular, it is essential that the plants produce a satisfactory crop of fruits (only in female) during both the growing cycles.
3. The tests should be designed to observing/testing a total of at least 5 plants, such plants or parts of plants may be removed for observations without prejudice to the observations which must be carried on to the end of the growing cycle.

4. Test Plot Design

Row to row distance	:	4.0 m
Plant to plant distance	:	2.0 m

5. Standard cultural practices specific to the location of the DUS test centres to be adopted with the approval of the Authority.

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.

- a) 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.
- b) 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.

- c) On-site testing may be conducted at the places specified by the applicant. The test shall be conducted on fully grown mature plants (>five year old) during fruiting season.
- d) A minimum five plants should be available for inspection and examination for 'On-site' DUS testing. The plants must be healthy and free from pest & disease.
- e) On-site examination shall be arranged during the fruiting season, when distinguishing characteristics of candidate population/ provenance can be examined and compared with those of the comparative population/ provenance as per the Test guidelines.
- f) The Expert Committee constituted by the PPV&FRA in consultation with the DUS Centre shall be authorized to inspect on-site testing to verify the appropriate characters.
- g) The Expert Committee shall take record of the observations recorded and validate the preliminary data and/or summary of the data.
- h) The Expert Committee shall submit examination report to the Authority.

III. 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.
3. All observations should be made on 5 single plants in each replication or parts taken from 5 plants. In the case of parts of plants, the number to be taken from each of the plant should be 3.
4. For the assessment of all colour characteristics, the Royal Horticultural Society (RHS) colour chart shall be used.
5. Each test shall include a total of at least 5 plants each in three replications. For assessment of Distinctiveness, Uniformity and Stability, all observations shall be made on all replicated plants.
6. Additional tests protocols for special purpose shall be established by the PPV & FR Authority.
7. The relevant growth stages corresponding to the code numbers are described below.

Growth Stages	Codes
Plant: Observations made/ should be made during winter dormancy. (December- February)	A
Shoot: Observations made /should be made during active growth period. (March-- July)	B
Leaf blade: Observations made/ should be made on mature leaves taken from the middle of the shoot, the third leaf of the current season's growth from the middle part of the plant. (July- August)	C
Pubescence: Observations made/ should be made with the help of magnifying glass during the active growth period.	D
Fruit: Observation made /should be made at the time of fruit maturity.	E

IV. Assessment of Distinctiveness, Uniformity and Stability

Distinctness

- **Clear Differences:** In all circumstances the differences between two clones clearly depends on many factors, and should be considered, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner must express independently. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.
- **Consistent Differences:** The differences observed between clones may be so clear that even one growing cycle is sufficient for testing. Further, in any circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between clones are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent and to examine the characteristic in at least two independent growing cycles, whereas the second cycle taken as reserve for confirmation.

Uniformity

- For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 5 plants from one replication, whereas no off- types are considered.

Stability

- In practice, there is no need to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many varieties, when a variety performs uniformly in repeated cycle, it can be considered as stable.
- Where required, or in case of doubt, stability may be tested, either by growing in a fresh growing cycle, or by testing a new plant stock to ensure that it exhibits the same characteristics as those shown by the previous tested material.

V. Grouping of Varieties

1. The candidate varieties for DUS testing shall be divided into groups to facilitate the assessment of Distinctiveness. The 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 features have been finalized as useful grouping characteristics:
 1. Plant: sex (characteristic no. 1)
 2. Plant: growth type (characteristic no. 2)
 3. Plant: attitude of mature branches (characteristic no. 3)
 4. Shoot: number of thorns (from middle part to top) (characteristic no. 11)
 5. Fruit: shape (characteristic no. 25)
 6. Fruit: colour of skin (characteristic no. 26)

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 or code (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 for the international harmonization of variety descriptors and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this as inappropriate or might misfit.

(+) See explanations on the Table of characteristics in section VII. It is to be noted that for certain characteristics the plant part on which observations are to be taken / given in the explanation or figure(s) for clarity.
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

Table: Methodology adopted for recording of observation on Qualitative and Quantitative characteristics.

Sl. No.	Character	Methodology
1.	Plant : Sex	To be observed at full blooming stage/ at fruit bearing stage (July-September).
2.	Plant: Growth Type	To be observed on the basis of Habit including size of Plant.
3.	Plant : Attitude of Mature Branches	The Angle of branch from the main stem to be measured with the help of a geometric instrument/tool.
4.	Branch Length	Primary branches in middle 1/3 rd of the main stem and to be measured by using scale and mean expressed in cm.
5.	Stem Shape (Cross Section)	To be recorded from the main branch, 15 cm above soil level.
6.	Current Season	To be recorded on current season stem colour, 5cm

	stem colour	below the stem tip.
7.	Mature stem colour	To be recorded on main stem, 25cm above soil level
8.	Plant:Density of Shoots	The number of shoots to be counted from the main stem in 100 cm length in the middle part of the plant leaving top and bottom part of the plant.
9.	Plant :Position of Inflorescence	To be observed from the position of inflorescence on one year -old shoots and both on one year old and older shoots, respectively. Female Inflorescence small, axillary and male Inflorescence a catkin , borne in spring before emergence of leaves.
10.	One-Year old Shoot: Thickness	To be measured by the vernier caliper in the middle of the shoot.
11.	Shoot: Number of thorns	Total number of thorns to be recorded at a unit of per 10 centimeter each of 2 and 3 year old shoots at 5 branches of the plant in all four sides / directions i.e. 100 cm unit, which can be depicted on 10 cm unit basis also i.e. No. of thorns per 10 cm of 2 or 3 year old shoots of the plant.
12.	Shoot :length of Thorns	Lateral thorns are assessed exclusively, since the terminal thorns (at the tip of the central leading shoots) are longer.
13.	Time of beginning of flowering	The time taken from flowering to fruit maturation is 12 to 15 weeks. Time of beginning of flowering is when 10 % of flower are fully open. Early : 1 st fortnight of April Medium : 2 nd fortnight of April Late : 1 st fortnight of May
14.	Leaf Blade: Shape	Observation should be made on mature leaves taken from the middle of the shoot, the third leaf of the current season's growth from the middle part of the plant.
15.	Leaf length	To be recorded as mean length of 10 leaves from the base of old branches. Length is measured from the base to the tip of the leaf blade. Total length of leaf blade is to be recorded with the help of measuring scale and expressed in centimeters(cm).
16.	Leaf width	To be recorded on same leaves used for the measurement of leaf length. Width is to be measured at the widest portion of the leaf.
17.	Leaf density	To be recorded at flowering stage on 2 year old shoot at 10 cm unit scale.
18.	Leaf Blade :Undulation of Margin	To be recorded at mature stage of leaf.
19.	Leaf Blade : Colour of adaxial surface	To be recorded at mature stage of leaf.
20.	Leaf Blade: Intensity of Green Colour of adaxial surface	To be recorded at mature stage of leaf.
21.	Leaf Blade : Pubescence of abaxial surface	Observations should be made with the help of magnifying glass during the active growth period.
22.	Fruit length	To be recorded mean length of 100 fully mature fruits

		randomly harvested from a single plant.
23.	Fruit width	To be recorded on the same fruits used for measuring the fruit length. Width is to be recorded at the widest portion of the fruit.
24.	Fruit weight	To be recorded the mean weight of 100 randomly collected fruits.
25.	Fruit: shape	To be recorded at full fruit maturity.
26.	Fruit :colour of skin	To be recorded at full ripe stage. Colour is observed with the help of RHS colour chart.
27.	Fruit: Pubescence	Observation should be made at full ripe stage, using a magnifying glass.
28.	Fruit : Length of Stalk	To be recorded at full fruit maturity.
29.	Time of beginning of fruit ripening	Time of fruit maturity is when at least 50 % of fruits have achieved the full colour. Early : 2 nd week of August to 4 th week of August Medium : 1 st week of September to 3 rd week of September Late : 4 th week of September to 2 nd week of October
30.	Seed length	To be recorded using vernier caliper on seeds extracted from fully ripe fruits after drying.
31.	Seed width	To be recorded as for seed length.
32.	Seed weight	The seed weight is to be recorded of 100/1000 mature seeds as follows: 100 seed weight or thousand seed weight.
33.	Seed coat colour	To be recorded on seeds extracted from fully ripe fruits after drying. Seed coat colour is observed with the help of RHS colour chart.
34.	Seed tip: Shape	To be observed on seeds extracted from fully ripe fruits after drying and categorized as angular and wedge shaped.

5. Type of assessment of characteristics indicated in column number 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	Example varieties		Stage of observation	Type of assessment
				Male ♂	Female ♀		
1. (* (+ (QL)	Plant: Sex	Female	1	-	SHEIGO DIHAR-F75	B	VG
		Male	2	POH	-		
2. (* (+ (QL)	Plant : Growth Type	Small Tree -Type	1	POH	SCHILLING DIHAR-F64	A	VG
		Shrub- Type	2	-	RANGREEK, TABO		
3. (* (+ (PQ)	Plant : Attitude of Mature Branches	Erect (30° to 50°)	1	-	MANE	A	VG
		Semi- Erect (>50° to 70°)	2	POH	SCHILLING		
		Horizontal (>70° to 90°)	3	-	LARI DIHAR-F74		
		Arching (>90° to 110°)	4	-	HURLING DIHAR-F75		
4. (* (QN)	Branch Length (cm)	Short (35 to 40)	3	-	MANE	A	VG
		Medium (>40 to 45)	5	POH	LARI		
		Long (>45 to 50)	7	-	RANGREEK		
5. (* (QL)	Stem shape (cross section)	Rounded	3	-	SHEIGO, LARI	B	VG
		Angular	5	POH	HURLING		
6. (* (QL)	Current Season stem colour	Green (N138,A)	1	POH	RANGREEK	B	VG
		Silvery (155,A)	3	-	HURLING		
		Light brown(199,C)	5	-	LARI		
		Brown (199,A)	7	-	MANE		
7. (* (QL)	Mature stem colour	Reddish brown (178,B)	3	-	KAZA	B	VG
		Brown (200,C)	5	POH	LARI		
		Dark brown (200,A)	7	-	MANE		
8. (* (QN)	Plant: Density of Shoots No. (100 cm)	Sparse (< 5)	3	-	LARI, HURLING	B	VG
		Medium (5 to 10)	5	-	SCHILLING PIN VALLEY DIHAR-F75		

		Dense (<10 to 15)	7	POH	TABO DIHAR-F64		
9. (* (QL)	Plant: Position of Inflorescence	On one year old shoot only	1	-	SCHILLING	B	VG
		Both on one -year - old and older shoots	2	POH	RANGREEK, DIHAR-F64, DIHAR-F75		
10. (* (+) (QN)	One- year-old Shoot : Thickness (mm)	Thin (3 to 5)	3	-	MANE, PIN VALLEY	B	MS
		Medium (>5 to 7)	5	-	RANGREEK, SHEIGO, DIHAR-F75		
		Thick (>7 to 9)	7	POH	KAZA		
11. (* (QN)	Shoot : Number of thorns (No.) (from middle part to top): Total of 100 cm length	Absent	1	-	-		
		Very Less (< 25)	3	-	HURLING DIHAR-F64	B	VG
		Less (>25 to 50)	5	POH	SCHILLING		
		Many (>50 to 100)	7	-	SHEIGO DIHAR-F75		
		Too Many (>100 to 125)	9	-	RANGREEK, TABO		
12. (* (+) (QN)	Shoot : length of Thorns (mm)	Short (< 5)	3	-	TABO	B	MS
		Medium (>5 to 10)	5	POH	LARI DIHAR-F74		
		Long (>10 to 15)	7	-	RANGREEK, SCHILLING		
13. (* (QN)	Time of Beginning of Flowering	Early (1 st fortnight of April)	3	-	PIN VALLEY	B	MG
		Medium (2 nd fortnight of April)	5	-	TABO		
		Late (1 st fortnight of May)	7	POH	KAZA		
14. (* (+) (PQ)	Leaf Blade : Shape	Narrow Elliptic	1	-	SCHILLING, PIN VALLEY, KAZA, DIHAR-F64	C	VG
		Narrow Ovate	2	POH	MANE, HURLING		
15. (* (QN)	Leaf Length (cm) : (Mature shoot)	Small (2 to 4)	3	-	LARI, DIHAR-F74	C	MS
		Medium (<4 to 6)	5	POH	KAZA, DIHAR-F64		

		Large (<6 to 8)	7	-	SCHILLING		
16. (* (QN)	Leaf Width (cm) : (Mature shoot)	Small (0.30 to 0.60)	3	-	HURLING DIHAR-F74	C	MS
		Medium (>0.60 to 0.90)	5	-	LARI DIHAR-F64		
		Large (>0.90 to 1.20)	7	POH	SCHILLING		
17. (* (QL)	Leaf Density: No. of Leaves per 10 cm of current season shoot (No.)	Low (10 to 20)	3	-	PIN VALLEY	C	MS
		Medium (>20 to 30)	5	POH	RANGREEK, MANE		
		High (>30 to 40)	7	-	HURLING SCHILLING		
18. (* (QL)	Leaf Blade : Undulation of Margin	Absent	1	POH	TABO DIHAR-F75	C	VG
		Present	9	-	HURLING		
19. (* (+) (QL)	Leaf Blade : Colour of Adaxial surface	Green	1	POH	RANGREEK, TABO	C	VG
		Silverish	2	-	LARI		
20. (* (QN)	Leaf Blade: Intensity of Green Colour of Adaxial surface	Light	1	-	LARI, PIN VALLEY	C	VG
		Medium	2	POH	RANGREEK, HURLING		
		Dark	3	-	MANE		
21. (* (QN)	Leaf Blade : Pubescence of Abaxial surface	Weak	3	-	RANGREEK, SHEIGO	D	VG
		Medium	5	POH	KAZA		
		Strong	7	-	SCHILLING		
22. (* (QN)	Fruit Length (mm)	Small (6 to7)	3	-	HURLING	E	MS
		Medium (>7 to 8)	5	-	TABO DIHAR-F75 PIN VALLEY		
		Large (>8 to 9)	7	-	SHEIGO, SCHILLING		
23. (* (QN)	Fruit Width (mm)	Small (4.5 to5.5)	3	-	HURLING	E	MS
		Medium (>5.5 to 6.5)	5	-	TABO		

					DIHAR-F74		
		Large (>6.5 to 7.5)	7	-	SCHILLING DIHAR-F64		
24. (* (QN)	Fresh Fruit weight (g)	Light (11 to 13)	3	-	HURLING	E	MG
		Medium (>13 to 15)	5	-	TABO DIHAR-F74		
		Heavy (>15 to 17)	7	-	SHEIGO DIHAR-F64		
25. (* (+) (PQ)	Fruit : Shape	Pear-Shaped	1	-	RANGREEK	D	VG
		Ovate	2	-	MANE		
		Transverse Elliptic	3	-	HURLING		
		Circular	4	-	LARI		
		Elliptic	5	-	TABO		
		Oblong	6	-	SHEIGO DIHAR-F64		
26. (* (+) (PQ)	Fruit : Colour of skin	Light Yellow (9,A)	1	-	SCHILLING	D	VG
		Dark Yellow (13,A)	2	-	HURLING		
		Yellow Orange (23,A)	3	-	SHEIGO, DIHAR-F64		
		Orange Red (N30,A)	4	-	KAZA, DIHAR-F74		
		Red (44,A)	5	-	PIN VALLEY		
27. (* (QN)	Fruit: Pubescence	Weak (Sparse)	3	-	HURLING	D	VG
		Medium (Dense)	5	-	SCHILLING		
		Strong (Very Dense)	7	-	SHEIGO		
28. (* (QN)	Fruit: Length of Stalk (mm)	Short (1 to 2)	1	-	HURLING	D	VG
		Medium (>2 to 3)	5	-	TABO DIHAR-F75		
		Long (>3 to 4)	7	-	PIN VALLEY		
29. (* (QN)	Time of beginning of Fruit Ripening	Early (2 nd week of August to 4 th week of August)	3	-	LARI, SCHILLING	E	MG
		Medium (1 st week of September to 3 rd week of September)	5	-	TABO DIHAR-F75		
		Late (4 th week of September to 2 nd week of October)	7	-	RANGREEK		

30. (* (QN)	Seed Length (mm)	Short (2 to 3)	3	-	HURLING	E	MS
		Medium (>3 to 4)	5	-	SHEIGO, DIHAR-F74		
		Long (>4 to 5)	7	-	DIHAR-F64		
31. (* (QN)	Seed Width (mm)	Short (1 to 1.5)	3	-	HURLING	E	MS
		Medium (>1.5 to 2)	5	-	SHEIGO		
		Long (>2 to 2.5)	7	-	DIHAR-F64		
32. (* (QN)	Seed Weight(g) : 100 seeds	Light (0.84 to 0.96)	5	-	HURLING	E	MG
		Medium (>0.96 to 1.08)	7	-	SHEIGO, MANE		
		Heavy (>1.08 to 1.20)	9	-	DIHAR-F64		
33. (* (+ (QL)	Seed coat colour	Grey -Brown (N 199,C)	1	-	RANGREEK	E	VG
		Brown (200,A)	3	-	SHEIGO DIHAR-F75		
		Black (203,B)	5	-	HURLING		
34. (* (+ (QL)	Seed tip: shape	Angular	3	-	SCHILLING	E	VG
		Wedge shaped	5	-	KAZA		

VIII. Explanation for the Table of Characteristics

Characteristics 1: Plant: Sex



Female
(1)



Male
(2)

Characteristics 2: Plant : Growth Type

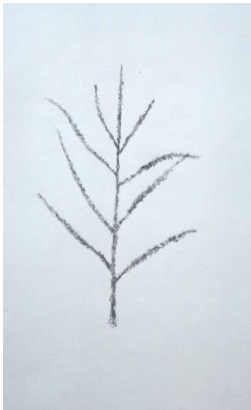
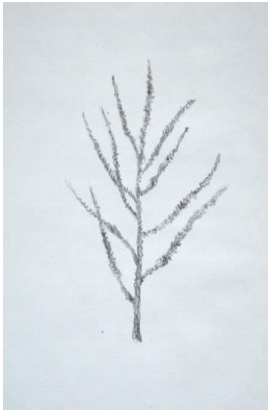


Small Tree -Type
(1)



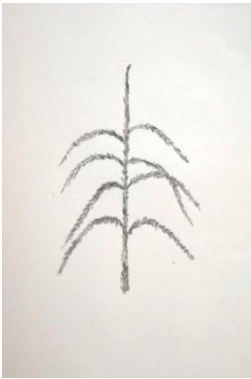
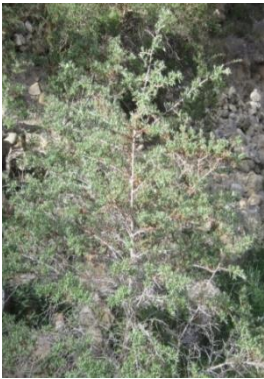
Shrub- Type
(2)

Characteristics 3: Plant -Attitude of Mature Branches



**Erect
(1)**

**Semi- Erect
(2)**



**Horizontal
(3)**

**Arching
(4)**

Characteristics 11: Shoot number of thorns (from middle part to top)



**Very Less
(3)**

**Less
(5)**



Many
(7)



Too Many
(9)

Characteristics 12: Shoot: Length of Thorns



Short
(3)

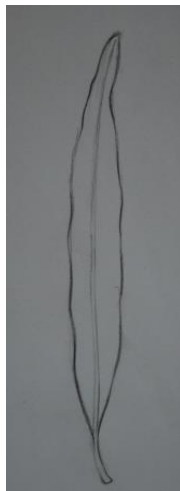


Medium
(5)



Long
(7)

Characteristics 14: Leaf Blade: Shape



Narrow Elliptic

(1)



Narrow Ovate

(2)

Characteristics 19: Leaf Blade: Colour of Adaxial surface

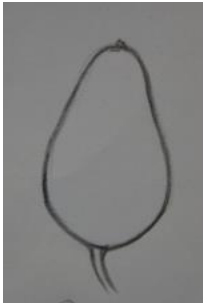


**Green
(1)**



**Silverish
(2)**

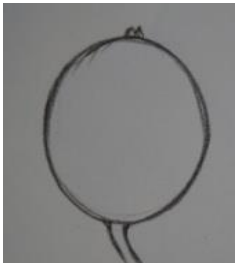
Characteristics 25: Fruit Shape



**Pear-shaped
(1)**



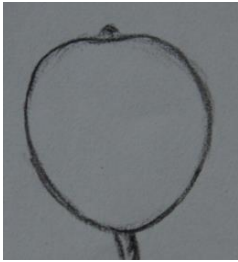
**Ovate
(2)**



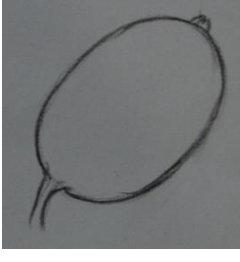
**Transverse elliptic
(3)**



**Circular
(4)**

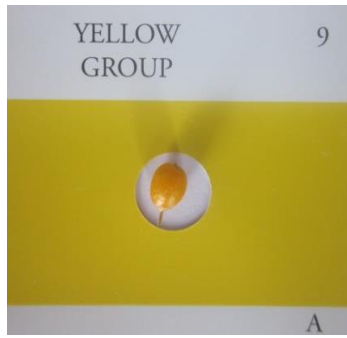


**Elliptic
(5)**

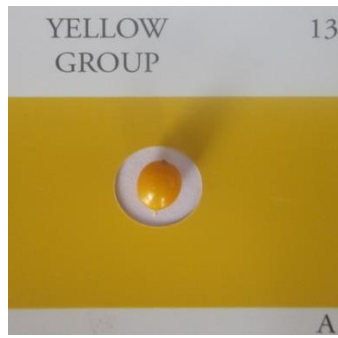


**Oblong
(6)**

Characteristics 26: Fruit : colour of skin



**Light yellow
(1)**



**Dark yellow
(2)**



**Yellow orange
(3)**

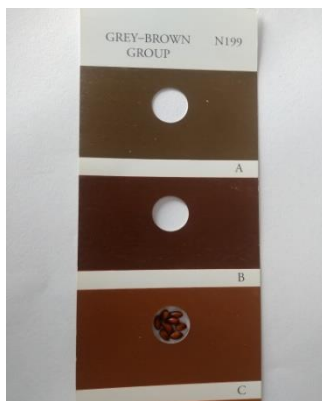


**Orange red
(4)**



**Red
(5)**

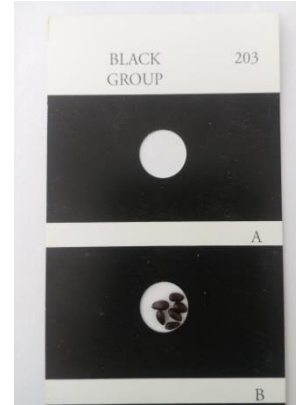
Characteristics 33: Seed coat colour



**Grey Brown
(1)**



**Brown
(3)**

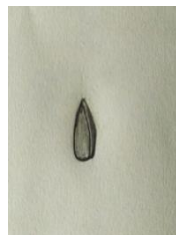


**Black
(5)**

Characteristics 34: Seed tip: shape



**Angular
(3)**



**Wedge-shaped
(5)**



IX. Working Group Details

The DUS test guidelines developed by the Task Force (02/2018) constituted by the PPV & FR Authority for **Seabuckthorn (*Hippophae rhamnoides* L.)** with consultation by Nodal Officer, Department of Tree Improvement & Genetic Resources, Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni, Solan (HP) and Defence Institute of High Altitude Research (DRDO), UT of Ladakh. Technical inputs also provided by the PPV & FR Authority.

- | | | |
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| 3. | Dr. Kulraj Singh Kapoor,
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Himalayan Forest Research Institute,
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| 4. | Dr. R.N. Sehgal
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| 5. | Dr. Tsering Stobdan
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Defence Institute of High Altitude Research, Leh
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| 6. | Dr. H.P. Sankhyan
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Department of Tree Improvement and Genetic Resources,
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Nauni, Solan, Himachal Pradesh- 173 230 | PI of DUS Test Centre |
| 7. | Dr. Ravi Prakash
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X. Name of DUS Test Centres

Lead DUS Test Centre	Collaborating DUS Test Centre
Regional Horticulture Research Station Tabo, Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni, Solan, Himachal Pradesh -173 230.	Defence Institute of High Altitude Research, Leh (DRDO), UT of Ladakh-194 101.