VARIETY TESTING MANUAL

Strengthening Seed Certification Activities Project

Seed Certification Agency

Ministry of Agriculture

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Tel 02-49272200
E-mail : director@sca.gov.bd
pdsscapsca@gmail.com
Website : www.sca.gov.bd

Edited by :
Krishibid Abdur Razzak, Director, SCA, Gazipur.
Krishibid Dr. Shukdeb Kumar Das, Project Director, SSCAP, SCA, Gazipur.
Krishibid Dr. Md. Zakir Hossian, Deputy Director (Quality Control), SCA, Gazipur.
Krishibid Ms. Rouson Ara Begum, Additional Deputy Director (Seed Regulation & Quality Control), SCA, Gazipur.
Krishibid Md. Salahuddin, Assistant Project Director, SSCAP, SCA, Gazipur.
Krishibid Rebeka Parveen, Sample Collection Officer, SCA, Gazipur.
Krishibid Farhana Jenny, Sample Collection Officer, SCA, Gazipur.
Krishibid Md. Shohidul Islam, Monitoring & Evaluation Officer, SSCAP, SCA, Gazipur.
Krishibid Popy Rani Roy, Sample Collection Officer, SCA, Gazipur.

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Strengthening Seed Certification Activites Project (SSCAP)
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INTRODUCTION

In Bangladesh, during the last decades considerable efforts have been made to improve seed production and supply. There is also growing awareness of the value of quality seed in increasing agricultural production. More attention would need to be given, in the preparation and implementation on evaluation and release of new varieties, and hence, quality control and distribution of seeds are ensured. In Seed Certification Agency, Proposed varieties are being tested for their uniqueness and agronomical merit such as yield through DUS and VCU test. This publication of 'Variety testing manual' followed by UPOV (The International Union for the Protection of New Varieties of Plants) guidelines will definitely help authorities who are directly related to conduct DUS (Distinctness, Uniformity and Stability) test in SCA to meet up the technical standards to examine the DUS of new varieties of plants and ensure Plant Breeders' Rights. In this manual, procedure of VCU test and DUS test, Pre-post control and Grow-out tests for seven notified crops (rice, jute, wheat, potato, sugarcane, kenaf and mesta) have been elucidated in details. That is why this publication will have important significance both for promoting of good quality seeds of new varieties and breeders right.

While every effort has been made to ensure the accuracy of information in this manual, there might be a number of errors for improvement. Any constructive feedback is welcome to help make this manual more practical, comprehensive and user-friendly resource.

As 'Project Director' of "Strengthening of Seed certification agency" project I feel honored to be a part of publishing this manual. I humbly extend my thanks to Dr. Md. Zakir Hossain, DD(QC); Ms. Rouson Ara Begum, ADD (SR & QC); Md Salahuddin, APD; Rebeka Parveen, SCO; Farhana Jenny, SCO; Md shohidul Islam M&EO; and Popy Rani Roy, SCO for their valuable contribution. Valuable remarks on this Publication will be cordially accepted for next edition.

Dr. Shukdeb Kumar Das
Project Director

PREFACE

Seed is the basic input in agriculture. To feed 160 million people of the country and to achieve sustainable food and nutrition security, we must develop high quality varieties to increase yield vertically. Seed Science and Technology is no more confined within the developed countries. According to UPOV, DUS test activities are being practised in our country through Seed Certification Agency as a routine work for release of new varieties of notified crops since 2000. Proposed varieties are tested to determine if they are unique, to make a botanical descriptor and to ensure their agronomic merit. The varieties which successfully passed the DUS test for uniqueness and VCU test for merit are put in the list of new varieties. In addition, varieties that pass through DUS test become eligible for a grant of Plant Breeders' Right, a form of intelectual property right which allows the breeder to recoup his investment by charging royalties for the growing of his variety.

I am glad to know that Strengthening Seed Certification Activities Project is publishing a Variety Testing Manual for seven notified crops (rice, wheat, jute, potato, sugracane, kenaf & mesta). I hope this will be a path finder to the variety testing officers and breeders as well as seed technologists. This may be used as a reference book for those who will conduct DUS, VCU, Pre-post control Grow-out tests. Valuable suggestions from every corner will be cordially accepted for its improvement in next edition.

I would like to give my thanks to Md. Zakir Hossian, DD (QC); Ms. Rouson Ara Begum, ADD (SR & QC) and Rebeka Parveen, SCO, Farhana Jenny, SCO, Popy Rani Roy, SCO for their tireless efforts for compilation and proof reading of the manual. Special thanks to Dr. Sukdeb Kumar Das, Project Director, Strengthening Seed Certificatation Activities Project for Printing this Manual.

We must continue our coordinated endeavour to provide the farmers with superior varieties of crops.

Abdur Razzak
Director

ACRONYMS

MoA	= Ministry of Agriculture
SCA	= Seed Certification Agency
DAE	= Depertment of Agricultural Extension
BJRI	= Bangladesh Jute Research Institute
NSB	= National Seed Board
NTC	= National Technical Committee
UPOV	= The International Union for the Protection of New Variety of Plants
ISTA	= International Seed Testing Association
AD (FAPM)	= Additional Director (Field Administration, Planning & Monitoring)
AD (SR & QC)	= Additional Director (Seed Regulation & Quality Control)
DD (SR)	= Deputy Director (Seed Regulation)
DD (QC)	= Deputy Director (Quality Control)
RSCO	= Regional Seed Certification officer
ADD (SR & QC)	= Additional Deputy Director (Seed Regulation & Quality Control)
SP	= Seed Pathologist
SCO	= Sample Collection Officer
DUS	= Distinctness, Uniformity & Stability
VCU	= Value for Cultivation & Uses
PBR	= Plant Breeders' Right
PLRV	= Potato Leaf Roll Virus
PMV	= Potato Mosaic Virus
BS	= Breeder Seed
FS	= Foundation Seed
CS	= Certified Seed
MM	= Market Monitoring

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VARIETY RELEASE AND REGISTRATION SYSTEM IN BANGLADESH

Distinctness, Uniformity and Stability tests: Under the variety release mechanism, there is a provision of DUS tests for notified crops such as rice, wheat, jute, potato, sugarcane, kenaf and mesta by the SCA according to UPOV guide lines. At present, NSB has approved the DUS test procedure for rice, wheat, jute, potato, Sugarcane, kenaf and mesta. At the same time of multilocation test, with characterization list of proposed varieties, breeders should supply to SCA 1 kg seeds of rice and wheat, 250gm seeds of jute and 120 tubers for potato. with two thousand taka per line as DUS Test fee. SCA performs DUS test at its control farm/necessary suitable location in next two consecutive seasons.

Value for Cultivation and Uses Tests through field evaluation: Breeders select outstanding entries (if any) as proposed variety from multilocation trial and then give proposal to the NSB in a prescribed form for final evaluation VCU Tests of the varieties. The proposed variety trial (PVT) is conducted in collaboration with RSCO and DAE at farmer's fields of different regions of the country. One or two standard variety is used as check. Each trial is evaluated by the field evaluation team of NSB chaired by the Additional Director of DAE of respective Region.

National Technical Committee and NSB Recommendation: VCU Tests (Field evaluation trial) results of proposed variety are compiled by the Variety Testing officers of SCA. Compiled results of VCU and DUS tests results are discussed NTC of NSB. Satisfactory results of proposed variety(if any) are then recommend by NTC to NSB for final approval. By NSB approval, proposed line(s) are released as commercial variety after gazette notification.

In case of non-notified crops, VCU & DUS tests are not necessary. After developing a variety, respective research institute apply with government declared registration fee to the Seed Wing, Ministry of Agriculture for registration. After registration the proposed variety is approved to cultivate as a commercial variety.

PURPOSE AND IMPORTANCE OF PRE-POST CONTROL GROW-OUT TEST

A pre-post control grow-out test is one of the cheapest and simplest way to prove and to show whether the genetic purity of seed lots are up to the mark. Since 1997-1998 pre-post control grow-out test started to conduct in SCA control farm.

Genetic purity can be defined as the uniformity of the seed lot complying with the original plant type that has been described or commonly known in case the description is absent. Observing the genetic purity of a seed lot involves comparing the plants grown from a seed lot with the description of the original plant-type. Deviations from the original plant type, off-type can be divided into genetic variants and admixtures. Admixtures are due to unclean working practices resulting in the mixtures of small quantities from two or more seed lotes of different varieties. In self pollinating crops like wheat and rice admixtures are not as harmful as for crops having some extent of natural cross pollinating crops pollution. In self pollinating crops the admixtures may be removed, there by partly restoring the genetic quality of the seed lot. In crops showing a certain level of cross pollination the decline in genetic quality may not be reversed with the same ease and speed. In that case a distinction should be made for admixtures identifiable before on the one hand and admixture identifiable during and after flowering on the other. Admixtures can be removed with the same ease and speed in cross pollinated crops if the admixtures can be identified before flowering, but it is much more difficult if the admixtures can be identified only after flowering.

Genetic variants are caused by small deviations in genetic make-up from the original plant type. Genetic variants are either segregates or mutations but for certification purposes the subdivision yields no practical benefit. Genetic variants may be rouged from the field if they are visible, but even in case of self pollinated crops, the genetic make-up of the seed lot is changed and quite some of this change may not be visible at all. In subsequent generations segregates of the altered genetic make-up may be visible and therefore may be rouged out. The genetic make-up can, however, not be restored in one or two seasons, even in case of self pollinated crops.

PROCEDURE OF PRE-POST CONTROL GROW-OUT TEST FOR NOTIFIED CROPS

INTRODUCTION:

The following procedures have been suggested to carry out pre-post control grow out tests of four notified crops viz, Rice, Wheat, Jute, and Potato. These procedures are to be followed by the Seed Regulation & Quality Control Wing of the SCA.

Pre-control : Pre-control is the term applied to variety varification of early generation on seed i.e. breeder seed and foundation seed. When an early generation seed lot is being multiplied to produce a further generation of seed, the information provided by a control plot is invaluable in that it gives the National Designated Authority data on identity and quality that are available before -or about the same time- as the next seed crop is ready for field inspection. In this instance the test, which is referred to as a per-control test, is grown simultaneously with the seed crop of the following generation.

Pre-control is a very important componet of a seed multiplication and certification programme because of its ability to identify varietal identity and varietal purity insufficiencies at an early stage, before the become a major widespread problem. The pre-control is very reliable and for many species the only tool for the assessment of varietal identity. In addition, the pre-control generates useful information concerning varietal purity. seed-borne diseases etc. that can support the field inspection of the corresponding multiplications.

Post-Control : Post control test is done after certification of seed lots, looking backward and giving advice to the Seed Inspectors & seed producers as an internal quality control measure. Post control test of Breeder and Foundation seeds as serve pre-control for the Foundation and certified class of seeds respectively.

Grow out Test : The grow-out test is performed to assess the genetic purity of a specific seed lot after growing plants.

Seed Inspector : The District Seed Certifcation Officer of SCA serve as Seed Inspector as described in The Seed Act 2018 & Seed Rules 2020.

Off-type : A plant is considered to be an off-type when it differs clearly from the typical plants of the concerned variety in at least one described character.

Other variety : A plant differs clearly with respect to distinctive character (s) of the concerned variety and distinguishable as other variety of the same species.

B-Sample : The Seed Inspector will draw a composite sample of the seed lot according to the rules of the ISTA after offering a seed lot but before small packing. On the basis of utility, the Seed Inspector will divide the sample by a sample divider into 3 (three) sub-samples, namely, A-sample, B-sample and C-sample, The B-sample will be used for pre-post control grow-out test through SR & QC Wing in the SCA control farm at Gazipur.

TEST PERIOD

The trial period is normally done only one growing season.

TEST CENTRE

The test work on each sample is carried out normally at the SCA control farm. It may be vary due to crying need.

SAMPLES TO BE INCLUDED FOR PRE-POST CONTROL GROW-OUT TEST

(i) All Breeder seed lots.
(ii) All Foundation seed lots.
(iii) Randomly selected 10-20% Certified seed lots, Farmer's level and Market monitoring samples (if accommodation is possible)

PLOT SIZE AND PLANT NUMBERS

The size of the test plot and plant numbers to be considered on the basis of time of NSB approved field standard of seeds. At present the tolerance level off type and other varieties for Breeder seed of rice, wheat and jute is zero and for foundation class of seeds only four off types out of 4000 plants. In cases of certified, farmer's level and market monitoring sample only two off types out of 400 individual plants. Crop-wise required number of plants and plot size are given in Table1.

Table 1: Required number of plants and plot size for Rice, Wheat, Jute and Potato.

Crop	Breeder and Foundation seed lots		Certified, Farmers level/ Market monitoring samples	
	No. of plants	Plot size (m^2)	No of Plants	Plot size (m^2)
Rice	4000	162.304	400	16.533
Wheat	4000	61.44	400	6.6
Jute	4000	102.4	400	11
Potato	100	22.14	100	22.14

TIME OF SOWING/TRANSPLANTING

The time of sowing/transplanting is listed in Table 2. In order to make a planning the time when the number of samples and to be known by the Deputy Director (Quality Control).

Table 2: Timing of sowing/transplanting for Rice, Wheat, Jute and Potato.

Crop	DD (QC) should ascertain the no. of samples of each variety of BS, FS, CS/Farmer's Level/MM	Expected date of sowing/ Seedling raising	Expected date of transplanting
Rice-Aus	February	2nd week of March	2nd week of April
Rice-T.Aman	May	1st week of July	Last week of July
Rice-Boro	October	4th week of November	4th week of December
Wheat	September	1st week of November	-
Jute	February	March-April*	-
Potato	October	November	-

* Sowing date of jute depends on species and varietal nature.

POINTS TO BE CONSIDERED IN PLANNING

1. Land to be reserved for DUS testing.
2. The crop should be sown / transplanted in time.
3. Normal spacing specified for the crop should be use.
4. Every seed lot samples should be sown separately/single seedling to be transplanted per hill.
5. A snake-like sequence should be followed in preparing the field layout.
6. Sample of one variety should be planted/sown next to each other.
7. Within each variety, Breeder seed lot should be placed nearby to Foundation & Certified seed lots so that comparison can be done easily.
8. Different varieties of the same crop with similar characteristics to be planted next to each other.
9. Optimal cultural practices to be done to facilitate the full expression of all the characteristics.
10. Occurrence of volunteer plants and build-up of disease and pest has to be prevented / discouraged.

ASSESSMENT

An assessment for a Pre-post control test should comprise of important descriptive characters which are easily identifiable and genetically stable. On the other hand, if any special character is noticed then it should be recorded.

In each plot, for pre-control, all off types and other varieties should be recorded, while for post control it is enough to stop looking after more than 8 off-types and other varieties are found. Official descriptors and Breeder's seed lots are to be used for variety identity. The responsible officers will make the assessment in time under close supervision of senior officers. Sub Assistant Variety Testing Officer will help the Senior Officers.

CHARACTERS TO BE OBSERVED

A list of characters to be observed for pre-post control test of rice, wheat, jute and potato are shown in Table's No. 3 to 6

ASSESSMENT FORM

A Proforma of assessment form for Pre-post control test of rice, wheat, jute and potato are given Appendix I.

FIELD DAY

At least one field day should be arranged for every pre-post control test in time. Related personnel like Breeders, Seed Inspectors and seed Producers are to be invited to attend the field day. An "abstract" of Pre-post control test of the respective crop should be supplied to the concerned participants.

REPORTING

After completion of a pre-post control test, Sample Collection officers will submit a report on varietal identity and uniformity to the DD (QC) indicating acceptance or rejection of each seed lot. DD (QC) will communicate with the Director (SCA), throhgh Additional Director (SR & QC) for necessary action.

Table 3. Characters to be observed for pre-post control test of Rice

Sl. No.	Characteristics	Stage (Zadoks Scale)
1.	Leaf: colour	40
2.	Leaf : distribution of anthocyanin colouration	40
3.	Penultimate leaf : pubescence of blade	40
4.	Penultimate Leaf : anthocyanin colouration	40
5.	Flag leaf : curvature of blade	50
6.	Time of 50% heading	55
7.	Lemma : anthocyanin colouration	65
8.	Stem : length	70
9.	Stem : anthocyanin colouration of nodes	70
10.	Panicle : length	72
11.	Panicle : exertion	72
12.	Panicle : curvature of main axis	90
13.	Spikelet : hairs on lemma	60-80
14.	Spikelet : length of hairs on lemma	60-80
15.	Panicle : colour of tip of lemma	80-90
16.	Panicle : length of longest awn	90
17.	Panicle : distribution of awns	90
18.	Time of maturity	90
19.	Grain : length	92
20.	Grain : width	92

Table 4. Characters to be observed for pre-post control test of Wheat

Sl No	Characteristics	Stage (Zadoks Scale)
1.	Plant growth habit	25-29
2.	Leaf spiral (Flag leaf)	40-47
3.	Flag leaf auricle pigment	47-51
4.	Flag leaf attitude	47-51
5.	50% spike emergence	55
6.	Upper culm node hairs (Where essential)	55-75
7.	Glaucosity : spike	60-69
8.	Glaucosity : culm (neck)	60-69
9.	Glaucosity : flag leaf sheath	60-69
10.	Spike density	80-91
11.	Spike shape	80-91
12.	Lower glume : beak length	80-91
13.	Lower glume : beak shape	80-91
14.	Lower glume : beak spicules	80-91
15.	Lower glume : shoulder shape	80-91
16.	Lower glume : shoulder width	80-91
17.	Lower glume : keel inflection	80-91
18.	Spike length	80-91
19.	Awn length	80-91
20.	Spike colour	91
21.	Chaff colour	91
22.	Grain colour (Where essential)	91
23.	Grain shape -do-	91
24.	Ventral crease pit -do-	91
25.	Embryo shape -do-	91

Table 5. Characters to be observed for pre-post control test of Jute.

Sl. No.	Characteristics	Stage
1.	Stem colour (1st observation)	60 Days after sowing
2.	Leaf lamina colour	-do-
3.	Leaf vein colour	-do-
4.	Basal serration colour	-do-
5.	Leaf petiole colour	-do-
6.	Stipule	-do-
7.	Stipule colour	-do-
8.	Plant technical height	At pre-bud stage
9.	Branching habit	-do-
10.	Leaf angle	-do-
11.	Leaf length	-do-
12.	Leaf width	-do-
13.	Leaf shape	-do-
14.	Petiole length	-do-
15.	Pigmentation of flower buds	At appearance of flower buds
16.	Flowering date	At first flowering
17.	Stem colour (2nd observation)	At early fruiting stage before pod browning
18.	Pigmentation of fruit	-do-
19.	Seed dispersal mechanism	Before or during harvesting
20.	Seed coat colour	At harvesting stage

Table 6. Characters to be observed for pre-post control test of Potato.

Sl. No.	Characteristics	Stage
1.	Plant : height	Bud Stage
2.	Plant : type	-do-
3.	Plant : growth habit	-do-
4.	Stem : thickness of main stem	-do-
5.	Stem : extension of anthocyanin colouration	-do-
6.	Leaf : size	-do-
7.	Leaf : silhouette	-do-
8.	Leaf : intensity of green colour	-do-
9.	Leaf : extension of anthocyanin colouration of mid rib	-do-
10.	Leaflet : Size	-do-
11.	Leaflet : Width	-do-
12.	Leaflet : frequency of coalescence	-do-
13.	Leaflet : waviness of margin	-do-
14.	Leaflet : anthocyanin pigmentation of blade of young leaflets at apical rosette	-do-
15.	Leaflet : glossiness of the upper side	-do-
16.	Leaflet : frequency of secondary leaflets.	-do-
17.	Inflorescence : size	Flowering stage
18.	Inflorescence : anthocyanin colouration of peduncle	-do-
19.	Plant : frequency of flowers	-do-
20.	Flower : anthocyanin colouration of bud	-do-
21.	Flower : corolla size	-do-
22.	Flower corolla : colour of inner side	-do-
23.	Flower corolla : anthocyanin colouration of outer side in white flower.	-do-
24.	Plant : time of maturity	Ripening stage
25.	Tuber : shape	After harvest
26.	Tuber : depth of eyes	-do-
27.	Tuber : smoothness of skin	-do-
28.	Tuber : colour of skin	-do-
29.	Tuber : colour of flesh	-do-

Table 7: Zadoks code of growth stages

0	Germination
00	Dry seed
01	Start of water absorption (imbibitions)
02	-
03	Water absorption complete seed swollen
04	-
05	Root (radicle) emerged from seed
06	-
07	Shoot (coleoptiles) emerged from seed
08	-
09	Leaf just at coleoptiles tip
1	Seedling growth
10	First leaf through coleoptile
11	First leaf infolded
12	2 leaves unfolded
13	3 leaves unfolded
14	4 leaves unfolded
15	5 leaves unfolded
16	6 leaves unfolded
17	7 leaves unfolded
18	8 leaves unfolded
19	9 or more leaves unfolded
2	Tillering
20	Main shoot only
21	Main shoot and I tiller
22	Main shoot and 2 tillers
23	Main shoot and 3 tillers
24	Main shoot and 4 tillers
25	Main shoot and 5 tillers
26	Main shoot and 6 tillers
27	Main shoot and 7 tillers
28	Main shoot and 8 tillers
29	Main shoot and 9 or more tillers
3	Stem Elongation
30	Pseudostem (leaf sheath) exertion
31	1st node detectable
32	2nd node detectable
33	3rd node detectable
34	4th node detectable
35	5th node detectable
36	6th node detectable
37	Flag leaf just visible
38	-
39	Flag leaf ligule/collar just visible
4	Booting
40	-
41	Flag leaf sheath extending
42	-
43	Boots just visible swollen
44	-
45	Boots swollen
46	-
47	Flag leaf sheath opening
48	-
49	First awns visible (where appropriate)
5	Ear / Panicle Emergence
50	-
51	First spikelet or ear just visible
52	-
53	¼ of ear emerged
54	-
55	½ of ear emerged
56	-
57	¾ of ear emerged
58	-
59	Emergence of ear complete
6	Flowering
60	-
61	Beginning of anthesis
62	-
63	-
64	-
65	Flowering halfway
66	-
67	-
68	-
69	Flowering complete
7	Milk Development
70	-
71	Grain (caryopsis) water ripe
72	-
73	Early milk
74	-
75	Medium milk
76	-
77	Late milk
78	-
79	-
8	Dough Development
80	-
81	-
82	-
83	Early dough
84	-
85	Soft dough
86	-
87	Hard dough
88	-
89	-
9	Ripening
90	-
91	Grain hard
92	-
93	Grain loosening in day time
94	Over ripe straw dead and collapsing
95	Seed dormant
96	Viable seed giving 50% germination
97	Seed not dormant
98	Secondary dormancy induced
99	Secondary dormancy lost

PURPOSE AND IMPORTANCE OF DUS TEST

According to Article 7 of the 1961/1972 and 1978 Acts and Article 12 of the 1991 Act of the UPOV Convention, protection can only be granted in respect of a new plant variety after examination of the variety has shown that it complies with the requirements for protection laid down in those Acts and, in particular, that the variety is distinct (D) from other variety whose existence is a matter of common knowledge at the time of the filing of the application (here in after referred to as a "variety of common knowledge") and that it is sufficiently uniform (U) and stable (S), or DUS in short. The examination, or DUS Test, is based mainly on growing tests, carried out by the authority competent for granting Plant Breeders' Right or by seperate institutions, such as public research institutes, acting on behalf of that authority or, in some cases, on the basis of growing tests carried out by the breeder. The examination generates a description of the variety, using its relevant characteristics (e.g. plant height, leaf shape, time of flowering), by which it can be defined as a variety in terms of Article 1 (vi) of the 1991 Act of the Convention.

PURPOSE AND IMPORTANCE OF VCU TEST

VCU tests is crucial for strategically important food and industrial crops, in this case the notified varieties.

If VCU tests is properly done it can and will avoid the unnecessary release of varieties which in the market place prove useless as these varieties do not offer any added value to the end-user compared to varieties already in use. For instance a new to be released rice variety can be distinct, uniform and stable but if it offers no other added value, it just becomes an added name on the released variety list. SCA has been appointed by the National Seed Board to coordinate and organise the VCU tests, which implies a heavy (added) responsibility and work load. The Seed Regulation & Quality Control Wing of SCA is presently establishing the VCU testing criteria for notified crops. This involves a major coordination effort with the various plant breeders and research stations related to the notified crops. Criteria in VCU test are very much crop specific e.g. baking quality for wheat, cooking quality and palatability for rice, and tensile strength of jute fiber, etc. In the shake of farmers benefit, in future this system should to be developed up to the international standard.

PROCEDURE OF DUS TESTS FOR INBREED & HYBRID RICE

Introduction :

DUS test is essential for recognizing, distinguishing and describing a variety. The central theme is identification of a variety through the use of some parameters of characterization. DUS test is being followed in many countries of the world. In Bangladesh, this test has been made as part of the variety release mechanism. The ultimate benefit of DUS test will centre around Plant Breeders' Right and specially plant variety protection in view of the globalization of agribusiness. UPOV provides that procedure for conducting DUS test should be different for each species. The following proecdures have been approved by NSB for the assessment of DUS test in varieties of rice both released and to be released. These procedures are to be followed by all concerned dealing with variety development and release.

I. DEFINITIONS

DUS : Distinctness, Uniformity & Stability.

Distinctness : The variety shall be deemed to be distinct if it is clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of the filling of application (for release of the variety).

Uniformity : A variety shall be deemed to be uniform if subject to variation that may be expected from the particular features of its propagation it is sufficiently uniform in its relevant characteristics.

Stability : The variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation, or in the case of a particular cycle of propagation at the end of each such cycle.

Plot : A test field of 2,000 normal plants in which seeds/seedlings will be sown/transplanted in line at normal seed/seedling rate and spacing in two sets at 15 days interval.

Comparative rows: One plot each of two or more varieties grown adjacent to each other at normal seed rate and spacing.

Reference sample : A sample of seed submitted/collected from the breeder of a variety used for conducting tests as well as for retaining a portion of the seed to represent the variety as reference stock. The seed is for official use only.

Off-type : Plants or seeds deviating clearly from the characteristics of a variety as described by the breeder in any observable respect.

Progeny row : A row of plants resulting from the sowing of seeds from one plant in the following season.

NSB : National Seed Board.

Variety : A Plant grouping within a single botanical taxon of the lowest known rank, which grouping can be:

a) defined by the expression of the characteristic resulting from a given genotype;
b) distinguished from any other plant grouping by the expression of at least one of the said characteristics; and
c) considered as a unit with regard to its suitability for being propagated unchanged.

II. GENERAL DESCRIPTION

A. Test Period

Normally two consecutive years for which a proposed variety will be recommended. Tests may be continued for a third year if required.

B. Test Centre

The test work on each submission or collection (reference sample) will be carried out at the Seed Certification Agency (SCA). Field tests will be carried out in the SCA farm and laboratory tests in the Central Seed Testing Laboratory in Gazipur. If this site is not suited for field testing of certain varieties of rice then the tests will be conducted by SCA in a suitable research station in appropriate part of the country.

C. Material required

Test material to be submitted or collected only in the first year of testing.

1. Quantity: 1000 grams of rice seed.

2. Submission of Material :

The quantity of material mentioned should be submitted to the SCA with a label inside and outside the container of seed and an accompanying letter should mention at least:

a) Name of the sender with official designation
b) Reference number of the sample
c) Name of the organization responsible for maintaining that particular variety
d) Name of the variety/line of the seeds
e) Growing season
f) Quantity of seed
g) Date and place of sampling
h) Month and year of harvest
i) Nature and quantity of preservative, if any, added to the sample
j) Germination % as on (date)

3. The sample should be in the possession of SCA on or before the following dates :

a) Aus : on or before the first week of February
b) Aman : on or before the second week of May
c) Boro : on or before the first week of October

4. In case of pre-released variety the sample should be submitted to SCA one season before submission of application for release.

5. A descriptive list (as per agreed upon) filled up by breeder & a pair wise distinctive list of characters of most similar variety/varieties should be submitted.

D. Division of Material

The submitted or collected sample may be divided into 10:10:80 ratio of the quantity. The larger quantity will be preserved as the reference sample.

E. Test Layout

1. Year 1

A plot containing 1000 normal plants should be grown at normal seed rate and spacing. There will be another set with either fifteen days interval or in a different location.

2. Year 2

A plot containing 1000 normal plants should be grown at normal seed rate and spacing from the same seed lot used in the first year. There will be another set with either fifteen days interval or in a different location. Plant-to-row of variant plants will be grown to compare these plants with the plants grown from the reference samples.

3. Year 3

Same as year 2 (if necessary).

F. Comparative row test (if necessary)

A test with a few rows of very similar varieties of a crop are to be conducted each year side by side with the candidate variety.

III. TEST METHODS

For conduction of the test, the latest UPOV published guidelines and instructions are to be followed. Characters will be routinely recorded and verified throughout the growing period by the SCA personnel as is explained in the test guidelines and consequently a complete description of varieties will be prepared.

A. Year 1

Laboratory and field observation tests will be carried out to provide data on uniformity and for classification purposes.

1. Distinctness

Descriptive records will be verified from submitted or collected material and from harvested material. The differences will be recorded and a provisional description will be prepared.

2. Uniformity

Plants from submitted or collected materials will be required to comply with uniformity standards indicated in TG/1/3 of UPOV publication standard.

Off-Type plants will be detected and the characters in which they differ from the normal plants will be recorded. In general, the assessment of differences between variant plants and majority plants will be based on the level of differences required to differentiate between varieties.

When confirmation of the characters of suspected off-types is required, off-type plants and majority plants will be harvested, threshed and grown in the following appropriate season.

3. Stability

No specific test will be carried out but stability may inferred from the plots by noting variation and segregation within the grown form the collected or submitted sample.

B. Year 2

Laboratory and field observations will be carried out as in year 1.

1. Distinctness

Data obtained from first year observations will be compared with the data of second year's plots of the same variety. In addition, descriptive records will be prepared to supplement the first year's provisional report.

2. Uniformity

The observations made in the 2nd year will be used to confirm the provisional report prepared in the first year.

IV. VISIT TO TEST CENTRE

The breeders are encouraged to visit the test centre to view their material and discuss with SCA.

V. REPORTING PROCEDURE

A. At the following stages a written summary of the data will be submitted by the SCA to the breeders.

1. If laboratory tests show a marked lack of purity and uniformity
2. If during field observation a marked lack of uniformity is evident
3. If the distinctness of a variety is difficult to establish.

B. Reports

1. Progress Report

The SCA will report to the breeders after each growing season about the result of 1st year trial.

2. Final Report

This report will be prepared following the second test season. It will include collected results, a description of the variety and, if appropriate, a conclusion of how to distinguish this variety from other varieties.

C. Standards

1. Distinctness

To be judged as distinct, a variety must be seen to be clearly distinguishable, consistent and repeatable, from any comparable variety in at least one character.

2. Uniformity

In the assessment of uniformity, Variations observed in plots grown from collected/submitted sample must normally be of demonstrable and repeatable order. Variation which is thought or prone to be due to environmental effects, is disregarded. In general, varieties must not exceed the tolerated maximum variant plant number mentioned in the TG/1/3 of UPOV guidelines.

3. Stability

Plots exceeding the fixed tolerated variant plants are considered to indicate a lack stability, which means, excessive lack of uniformity may imply lack of stability.

Table 8: List of characters for DUS Test of Inbreed and Hybrid Rice

Sl. No.	Characteristics	Observation time/stage (Zadok's scale)	States of the character	Code
1.	Leaf sheath: anthocyanin colour	15-17	Absent Present	1 9
2.	Leaf colour	25-40	Pale green Green Dark green Purple tip Purple margins Purple blotch Purple	1 2 3 4 5 6 7
3.	Penultimate leaf: pubescence	40	Absent or very weak Weak or only on the margins Medium hairs on the lower portion of the leaf. Strong hairs on the leaf blade Very strong	1 3 5 7 9
*4.	Penultimate leaf : anthocyanin colouration of auricles & collar	40	Absent Present	1 9
*5.	Penultimate leaf : ligule	40-45	Absent Present	1 9
6.	Penultimate leaf : shape of the ligule	40-45	Truncate Acute Split or two-cleft	1 2 3
*7.	Flag leaf : attitude of the blade	60-65	Erect (<30) Intermediate or semi-erect (30-45) Horizontal (46-90) Reflexed or descending (>90)	1 3 5 7
*8.	Time of heading (50% of plants with heads)	55	Very early (<70days) Early (70-85 days) Medium (86-105 days) Late (106-120 days) Very late (>120 days)	1 3 5 7 9
*9 (a).	Male sterility	55-59	Absent CMS TGMS PGMS P(T)GMS	1 3 5 7 9

9 (b).	Microscopic Observation of Pollen with I_2-KI solution	55-59	Completely sterile with TA Pollen Completely sterile with 80% TA Pollen Completely sterile with 50% TA Pollen Sterile (91-99%) Partial sterile (31-70%) Partial fertile (31-70%) Fertile (21-30%) Fully fertile (0-20%)	1 2 3 4 5 6 7 8
10.	Lemma & Palea : anthocyanin colouration	75-85	Absent or very weak Weak Medium Strong Very strong	1 3 5 7 9
11.	Lemma : anthocyanin colouration of area below apex	75-85	Absent or very weak Weak Medium Strong Very strong	1 3 5 7 9
*12.	Lemma : anthocyanin colouration of apex	75-85	Absent or very weak Weak Medium Strong Very strong	1 3 5 7 9
13 (a).	Colour of stigma	65	White Light green Yellow Light purple Purple	1 2 3 4 5
13 (b).	Stigma exertion	68-69	No or a few (<5%) Low (5-20%) Medium (21-40%) High (41-60%) Very high (>61%)	1 3 5 7 9
14.	Stem: culm diameter (from 5 mother tillers in the lowest internode)	65	Small (<5.0mm) Medium (5.1 - 6.0mm) Large (6.1-70mm) Very Large (>7.0mm)	1 3 5 7
*15.	Stem length (culm length): measure from the base of the plants to the neck of the panicles	70	Very short (<40 cm) Short (41-60 cm) Medium (61-80 cm) Long (81 - 110 cm) Very long (>110 cm)	1 3 5 7 9
*16.	Stem: anthocyanin colouration of nodes	70	Absent Present	1 9

17.	Stem: intensity of anthocyanin colouration of nodes	70	Weak Medium Strong Very strong	3 5 7 9
18.	Stem: anthocyanin colouration of internodes	70	Absent or very weak Weak Medium Strong Very strong	1 3 5 7 9
*19.	Panicle length: measured from the neck to the tip of the panicle of main tillers without awns	72-90	Short (<20cm) Medium (21-25cm) Long (26-30cm) Very long (>30cm)	3 5 7 9
*20.	Panicle: curvature of main axis (i.e. recurved main axis)	90	Absent or very weak Weak Medium Strong	1 3 5 7
21.	Panicle: number of effective tillers per plant	75-90	Few (<6) Medium (6-10) Many (>10)	3 5 7
*22.	Spikelet: pubescence of lemma & palea	60-80	Absent or very weak Weak Medium Strong Very strong	1 3 5 7 9
23.	Spikelet: colour of the tip of lemma	65-90	White Yellowish Brownish Red Purple Black	1 2 3 4 5 6
24.	Spikelet: awns in the spikelet	90	Absent Present	1 9
25.	Spikelet: length of the longest awn.	90	Very short (<2mm) Short (2-5mm) Medium (5-10 mm) Long (11-20mm) Very long (>20mm)	1 3 5 7 9
*26 (a).	Panicle: distribution of awns	90	Tip only Upper half only Whole length	1 3 5
26(b).	Panicle: colour of awns	90	Yellow white Brown Reddish Purple Black	1 3 5 7 9

*27.	Panicle: attitude of branches	90	Erect Semi-erect Spreading	1 3 5
28.	Panicle: exertion	90	Enclosed Partly exerted Just exerted Moderately exerted Well exerted	1 3 5 7 9
29.	Time of maturity	92	Very early (<100days) Early (101-115 days) Medium (116-135 days) Late (136-150 days) Very late (>150 days)	1 3 5 7 9
30.	Grain: weight of 1000 fully developed grains (adjusted at 12% of moisture)	92	Very early (<15g) Low (16-19 g) Medium (20-23g) High (24-27g) Very high (>27g)	1 3 5 7 9
31.	Grain: length (without dehulling)	92	Very short (<6.0mm) Short (6.1-7.0mm) Medium (7.1-8.0mm) Long (8.1-9.0mm) Very long (>9.0mm)	1 3 5 7 9
32.	Sterile lemma length: measure at post harvest stage	92	Short (<1.5mm) Medium (1.5-2.5mm) Long (2.6-3.0mm) Very long (>3.0mm)	1 3 5 7
33.	Decorticated grain length (After dehulling, before milling)	92	Short (<5.5mm) Medium (5.6-6.5mm) Long (6.6-7.5mm) Very long (>7.5mm)	1 3 5 7
34.	Leaf senescence: penultimate leaves are observed at the time of harvest.	92	Late and slow (2 or more leaves retain green colour at maturity) Intermediate Early and fast (leaves are dead at maturity)	1 5 9
*35.	Decorticated grain: shape {length-width (widest point) ratio of dehulled grain}	92	Round (L:W <1.5) Bold (L:W = 1.5-2.0) Medium (L:W = 2.1 -2.5) Medium Slender (L:W = 2.6 -3.0) Slender (L:W >3.0)	1 3 5 7 9

36.	Decorticated grain (bran) : colour	92	White Light brown Variegated brown Dark brown Red Variegated purple Purple	1 2 3 4 5 6 7
37.	Polished grain : size of white core or chalkiness (% of kernel area)	92	Absent or very small Small (>10%) Medium (11-20%) Large (>20%)	1 3 5 7
38.	Endosperm : content of amylose (non waxy type varieties)	92	Low (<20%) Intermediate (21-25%) High (>25%)	1 3 5
39.	Decorticated grain: aroma	92	Absent Lightly present Strongly present	1 5 9
40.	Other distinct special character (if any)	Description:		

* The asterisk characteristics, which should always be included in description of the variety, except when the state of expression of a preceding characteristic renders this impossible (UPOV/MDN/95/4-T/1/3).

As a general rule (Quantitative characteristics), states are formed in such a way that for the weak and strong expression a reasonable word pair is chosen, for example:
Weak/strong
Short/large
These word pairs are given the notes 3 and 7 and word "medium" is given the notes 5.
The remaining states of the scale indicated by the notes I to 9 are formed according to the following example.

State	Note
Very weak	1
Very weak to weak	2
Weak	3
Weak to medium	4
Medium	5
Medium to strong	6
Strong	7
Strong to very strong	8
Very strong	9

(UPOV/MDN/95/4-T/1/3)

PROCEDURE OF DUS TESTS FOR WHEAT

Introduction:

DUS test is essential for recognizing, distinguishing and describing a variety. The central theme is identification of a variety through the use of some parameters of characterization. DUS test is being followed in many countries of the world. In Bangladesh, this test has recently been made part of the variety release mechanism. The ultimate benefit of DUS test will centre around Plant Breeders' Rights and specially Plant Variety Protection in view of the globalization of agribusiness. UPOV provides that procedure for conducting DUS test should be different for each species. The following procedures have been approved by NSB by the of assessment of DUS in varieties of wheat both released and to be released. These procedures are to be followed by all concerned dealing with variety development and release.

I. DEFINITIONS

DUS	: Distinctness, Uniformity & Stability.
Distinctness	: The variety shall be deemed to be distinct if it is clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of the application (for release of the variety).
Uniformity	: A variety shall be deemed to be uniform if subject to variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics.
Stability	: The variety shall be deemed to be stabled if its relevant characteristics remain unchanged after repeated propagation, or in the case of a particular cycle of propagation at the end of each such cycle.
Plot	: A test field of 500 plants in which seed will be sown in line at normal seed rate and spacing.
Comparative rows	: One plot each of two or more varieties grown adjacent to each other normal seed rate and spacing.

Reference sample : A sample of seed submitted/collected from the breeder of a variety used for conducting tests as well as for retaining a portion of the seed to represent the variety as reference stock The seed is for official use only.

Off-type : Plants or seeds deviating clearly from the characteristics of a variety as described by the breeder in any observable respect.

Progeny row : A row of plants resulting from the sowing of seeds from one plant in the following season.

NSB : National Seed Board

Variety : A plant grouping within a single botanical taxon of the lowest known rank, which grouping can be:

a) defined by the expression of the characteristic resulting from a given genotype;

b) distinguished from any other plant grouping by the expression of at least one of the said characteristics; and

c) Considered as a unit with regard to its suitability for being propagated unchanged.

II. GENERAL DESCRIPTION

A. Test Period

Normally two consecutive years for which a proposed variety will be recommended. Tests may be continued for a third year if required.

B. Test Centre

The test work on each submission or collection (reference sample) will be carried out at the SCA. Field tests will be carried out in the SCA farm and laboratory tests in the Central Seed Testing Laboratory in Gazipur. If this site is not suited for field testing of certain varieties of wheat then the tests will be conducted by SCA in a suitable research station appropriate part of the country.

C. Material required

Test material to be submitted or collected only in the first year of testing.

1. Quantity: Wheat Seed: 2 kg for released varieties
1 kg for to be released varieties.

2. Submission of Material:

The quantity of material mentioned should be submitted to the SCA with a label inside and outside the container of seed and an accompanying letter stating exactly the same information. The information on the labels and in the letter should mention at least:

a) Name of the sender with official designation
b) Reference number of the sample
c) Name of the organization responsible for maintaining that particular variety
d) Name of the variety/line of the seed
e) Growing season
f) Quantity of seed
g) Date and place of sampling
h) Month and year of harvest
i) Nature and quantity of preservative, if any, added to the sample
j) Germination % as on (date)

3. The sample should be in the possession of SCA on or before the following dates:
   On or before the 1st week of October
4. Incase of pre-released variety the sample should be submitted to SCA one season before submission of application for release.
5. A descriptive list (as per agreed upon) filled up by breeder & a pair wise distinctive list of characters of most similar variety/varieties should be submitted.

D. Division of Material

The submitted or collected sample may be divided into 10:10:80 ratio of the quantity. The larger quantity will be preserved as the reference sample.

E. Test Layout

1. Year 1

A plot containing 500 normal plants should be grown at normal seed rate and spacing. There will be another set with either fifteen days interval in planting or grown in a different location.

2. Year 2

A plot containing 500 normal plants should be grown at normal seed rate and spacing from the same seed lot used in the first year. There will be another set with either fifteen days interval or in a different location Plant-to-row of variant Plants will be grown to compare these plants with the plants grown from the reference samples.

3. Year 3

Same as year 2 (if necessary).

F. Comparative row test (if necessary)

A test with a few rows of very similar varieties of a crop are to be conducted each year side by side with the candidate variety.

III. TEST METHODS

For conduction of the test the latest UPOV published guidelines and instructions are to be followed. Characters will be routinely recorded and verified throughout the growing period by the SCA personnel as explained in the test guidelines and consequently a complete description of varieties will be prepared.

A. Year 1

Laboratory and field observation tests will be carried out to provide data on uniformity and for classification purposes.

1. Distinctness

Descriptive records will be verified from submitted or collected material and from harvested material. The differences will be recorded and a provisional description will be prepared.

2. Uniformity

Plants from submitted or collected materials will be required to comply with uniformity standards indicated in TG/1/3 of UPOV publication standard.

Off-type plants will be detected and the characters in which they differ from the normal plants will be recorded. In general, the assessment of differences between variant plant and majority plants will be based on the level of differences required to differentiate between varieties.

When confirmation of the characters of suspected off-type is required, off-type plants and majority plants will be harvested, threshed and grown in the following appropriate season.

3. Stability

No specific test will be carried out but stability may be inferred from the plots by noting variation and segregation within the plots grown from the collected or submitted sample.

B. Year 2

Laboratory and field observations will be carried out as in year 1.

1. Distinctness

Data obtained from first year observations will be compared with the data of second years plots of the same variety. In addition, descriptive records will be prepared to supplement the first year's provisional report.

2. Unifornity

The observations made in the 2nd year will be used to confirm the provisional report prepared in the first year.

IV. VISIT TO TEST CENTRE

The breeders are encouraged to visit the test centre by arrangement to view their material and discuss with SCA.

V. REPORTING PROCEDURE

A. At the following stages a written summary of the data will be submitted by the SCA to the breeders.

1. If laboratory tests show a marked lack of uniformity and purity
2. If during field observation a marked lack of uniformity is evident
3. If the distinctness of a variety is difficult to establish.

B. Reports

1. Progress Report

The SCA will report to the breeders after each growing season about the result of 1st year trial.

2. Final Report

This report will be prepared following the second test season. It will include collected results, a description of the variety and, if appropriate, a conclusion on how to distinguish this variety from other varieties.

C. Standards

1. Distinctness

To be judged as distinct, a variety must be seen to be clearly distinguishable, consistent and repeatable from any comparable variety in at least one character.

2. Uniformity

In the assessment of uniformity, variations observed in plots grown from collected/submitted sample must normally be of demonstrable and repeatable order. Variation which is thought or prone to be due to environmental effects, is disregarded. In general, varieties must not exceed the tolerated maximum variant plant number mentioned in the TG/1/3 of UPOV guidelines.

3. Stability

Plots exceeding the fixed tolerated variant plants are considered to indicate a lack of stability, which means, excessive lack of uniformity may imply lack of stability.

D. Characters

The characters in variety description and character states described will be based on that outline in the UPOV guidelines for the conduct of DUS tests.

Minimum list of character to describe wheat plants:

	Characters	Observation time (on the basis of Zadok's scale)
1.	Coleoptile pigment (To be done in the laboratory) Code 1 for absent Code 9 for present	09-11
2.	Plant growth habit Code 1 for erect Code 3 for semi-erect Code 5 for intermediate Code 7 for semi-prostrate Code 9 for prostrate	25-29
3.	Leaf spiral : (Flag leaf) Code 1 for absent Code 3 for weak Code 5 for moderate Code 7 for for strong Code 9 for very strong.	40-47
4.	Flag leaf auricle pigment Code 1 for absent Code 9 for present	47-51
5.	Flag leaf attitude Code 1 for all flag leaves are erect Code 3 for 1/4 of the plants with recurved flag leaves Code 5 for 1/2 of the plants with recurved flag leaves Code 7 for 3/4 of the plants with recurved flag leaves Code 9 for all plants with flag leaves are erect	47-51
6.	50% spike emergence (days to be quantified) Code 3 for early (<63 days) Code 5 for medium (63-70 days) Code 7 for late (>70 days)	55

7.	Upper culm node hairs Code 1 for absent or few Code 5 for medium Code 9 for very numerous	55-75
8.	Glaucosity: spike Code 1 for absent Code 3 for weak Code 5 for medium Code 9 for very strong	60-69
9.	Glaucosity: culm (neck) Code 1 for absent Code 3 for weak Code 5 for medium Code 9 for very strong	60-69
10.	Glaucosity: flag leaf sheath Code 1 for absent Code 3 for weak Code 5 for medium Code 9 for very strong	60-69
11.	Anther colour Code 1 for yellowish Code 9 for purple	62-68
12.	Straw wall thickness Code 1 for thin Code 5 for thick	80-92
13.	Spike density Code 3 for lax Code 5 for medium Code 7 for dense	80-92
14.	Spike shape Code 1 for club Code 5 for parallel Code 9 for taper	80-92

15. Lower glume: beak length (3rd spikelet upward from middle of the spike) 80-92
Code 3 for short (1-5mm)
Code 5 for medium (5.1-12mm)
Code 7 for long (12.1mm and above)

16. Lower glume: beak spicules 80-92
Code 1 for absent
Code 9 for present

17. Lower glume: shoulder shape 80-92
Code 1 for slope
Code 5 for square
Code 9 for elevated

18. Lower glume: shoulder width 80-92
Code 3 for narrow
Code 5 for medium
Code 7 for wide

19. Lower glume: keel inflection 80-92
Code 1 for absent
Code 9 for present

20. Lower glume: internal hair group 80-92
(Visible through 10x or 20x lens)
Code 1 for group 1 (few hairs confined to fold)
Code 5 for group 2 (hairs extending across part of shoulder)
Code 7 for group 3 (many hairs across shoulder)

21. Spike length 80-92
Code 3 for short (<10cm)
Code 5 for medium (10.1-12cm)
Code 7 for long (>12.1cm)

22. Awn length (At the tip of ear) 80-92
Code 1 for absent
Code 3 for short (3-5cm)
Code 5 for medium (5.1-7cm)
Code 7 for long (>7.1cm)

23.	Spike colour Code 1 for yellowish Code 2 for reddish brown	90-92
24.	Grain colour Code 1 for white or amber Code 2 for reddish	92
25.	Grain shape Code 1 for rounded Code 5 for ovoid Code 9 for elongated	92
26.	Ventral crease pit Code 1 for absent Code 9 for present	92
27.	Embryo shape Code 1 for round Code 9 for oval	92
28.	Grain colouration with phenol (To be done in the laboratory) Code 1 for none or very light Code 3 for light Code 5 for medium Code 7 for dark Code 9 for very dark	92
29.	Other distinct special characters (if any)	

PROCEDURE OF DUS TESTS FOR JUTE

Introduction:

DUS)test is essential for recognizing, distinguishing and describing a variety. The central theme is identification of a variety through the use of some parameters of characterization. DUS test is being followed in many countries of the world. In Bangladesh, this test has recently been made part of the variety release mechanism. The ultimate benefit of DUS test will centre around Plant Breeders' Rights and specially plant variety protection in view of the globalization of agribusiness. UPOV provides that procedure for conducting DUS test should be different for each species. The following procedures have been approved by NSB by the assessment of DUS in varieties of jute both released and to be released. These procedures are to be followed by all concerned dealing with variety development and release.

I. DEFINITIONS

DUS : Distinctness, Uniformity & Stability.

Distinctness : The variety shall be deemed to be distinct if it is clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of application (for release of the variety)

Uniformity : A variety shall be deemed to be uniform if subject to variation that may be expected from the particular features of its propagation. It is sufficiently uniform in its relevant characteristics.

Stability : The variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation, or in the case of a particular cycle of propagation at the end of each such cycle.

Plot : A test field of 500 plants in which, seed will be sown in line at normal seed rate and spacing.

Comparative rows : One plot each of two or more varieties grown adjacent to each other normal seed rate and Spacing.

Reference sample : A sample of seed submitted/collected from the breeder of a variety used for conducting tests as well as for retaining a portion of the seed to represent the variety as reference stock. The seed is for official use only.

Off-type : Plants or seeds deviating clearly from the characteristics of a variety as described by the breeder in any observable respect.

Progeny row : A row of plants resulting from the sowing of seed from one plant in the follwing season.

NSB : National Seed Board.

Variety : A plant grouping within a single botanical taxon of the lowest known rank, which grouping can be:

a) defined by the expression of the characteristics resulting from a given genotype;
b) distinguished from any other plant grouping by the expression of at least one of the said characteristics; and
c) Considered as a unit with regard to its suitability for being propagated unchanged.

II. GENERAL DESCRIPTION

A. Test period

Normally two consecutive years for which a proposed variety will be recommended. Tests may be continued for a third year if required.

B. Test Centre

The test work on each submission or collection (reference sample) will be carried out at the SCA. Field tests work carried out in the SCA farm and laboratory tests in the Central Seed Testing Laboratory in Gaziur. If this site is not suited for field testing of certain varieties of jute then the tests will be conducted by SCA in a suitable research station appropriate part of the country.

C. Material required

Test material to be submitted or collected only in the first year of testing.

1. Quantity: Jute Seed: 1 kg for released varieties.

250-300gms. for to be released varieties.

2. Submission of Material :

The quantity of material mentioned should be submitted to the SCA with a label inside and outside the container of seed and an accompanying letter stating exactly the same information. The information on the labels and in the letter should mentioned at least:

a) Name of the sender with official designation
b) Reference number of the sample
c) Name of the organization responsible for maintaining that particular variety
d) Name of the variety/line of the seed
e) Growing season
f) Quantity of seed
g) Date and place of Sampling
h) Month and year of harvest
i) Nature and quantity of Preservative, if any, added to the sample
j) Germination % as on (date)

3. The sample should be in the possession of SCA on or before the following dates.

a) Jute: *C. capsularis* on or before the 15th January.
b) Jute: *C. olitorius* on or before the 15th February.

4. Incase of pre-released variety the sample should be submitted to SCA one season before submission of application for release.
5. A descriptive list (as per agreed upon) filled up by breeder & a pair-wise distinctive list of characters of most similar varieties should be submitted.

D. Division of Material

The submitted or collected sample may be divided into 10:10:80 ratio of the quantity. The larger quantity will be preserved as the reference sample.

E. Test Layout

1. Year 1

A plot containing 500 normal plants should be grown at normal seed rate and spacing. There will be another set with either fifteen days interval in planting or grown in a different location.

2. Year 2

A plot containing 500 normal plants should be grown at normal seed rate and spacing from the same seed lot used in the first year. There will be another set with either fifteen days interval or in a different location. Plant to-row of variant plants will be grown to compare these plants with the plants grown from the reference samples.

3. Year 3

Same as year 2 (if necessary).

F. Comparative row test (if necessary)

A test with a few rows of very similar varieties of a crop are to be conducted each year side by side with the candidate variety.

III. TEST METHODS

For conduction of the test, the latest UPOV published guidelines and instructions are to be followed. Characters will be routinely recorded and verified throughout the growing period by the SCA personnel as explained in the test guidelines and consequently a complete description of varieties will be prepared.

A. Year 1

Laboratory and field observation tests will be carried out of provide data on uniformity and for classification purposes.

1. Distinctness

Descriptive records will be verified from submitted or collected material and from harvested material. The differences will be recorded and a provisional description will be prepared.

2. Uniformity

Plants from submitted or collected materials will be required to comply with uniformity standards indicated in TG/1/3 of UPOV Publication standard.

Off-type plants will be detected and the characters in which they different from the normal plants will be recorded. In general, the assessment of differences between variant plants and majority plants will be based on the level of differences required to differentiate between varieties.

When confirmation of the characters of suspected off-types is required, off type plants and majority plants will be harvested, threshed and grown in the following appropriate season.

3. Stability

No specific test will be carried out but stability may be inferred from the plots by noting variation and segregation within the plots grown from the collected or submitted sample.

B. Year 2

Laboratory and field observations will be carried out as in year1.

1. Distinctness

Data obtained from first year observations will be compared with the data of second year plots of the same variety. In addition, descriptive records will be prepared to supplement the first year's provisional report.

2. Uniformity

The observations made in the 2nd year will be used to confirm the provisional report prepared in the first year.

IV. VISIT TO TEST CENTRE

The breeders are encouraged to visit the test centre by arrangement to view their material and discuss with SCA.

V. REPORTING PROCEDURE

A. At the following stages a written summary of the data will be submitted by the SCA to the breeders.

1. If laboratory tests show a marked lack of uniformity and purity
2. If during field observation a marked lack of uniformity is evident
3. If the distinctness of a variety is difficult to establish.

B. Reports

1. Progress Report

The SCA will report to the breeders after each growing season about the result of 1st year trial.

2. Final Report

This report will be prepared following the second test season. It will include collected results, a description of the variety and, if appropriate, a conclusion on how to distinguish this variety from other varieties.

C. Standards

1. Distinctness

To be judged as distinct, a variety must be seen to be clearly distinguishable, consistent and repeatable from any comparable variety in at least one character.

2. Uniformity

In the assessment of uniformity, variations observed in plots grown from collected/ submitted sample must normally be of demonstrable and repeatable order. Variation which is thought or prone to be due to environmental effects, is disregarded. In general varieties must not exceed the tolerated maximum variant plant number mentioned in the TG/1/3 of UPOV guidelines.

2. Uniformity

The observations made in the 2nd year will be used to confirm the provisional report prepared in the first year.

IV. VISIT TO TEST CENTRE

The breeders are encouraged to visit the test centre by arrangement to view their material and discuss with SCA.

V. REPORTING PROCEDURE

A. At the following stages a written summary of the data will be submitted by the SCA to the breeders.

1. If laboratory tests show a marked lack of uniformity and purity
2. If during field observation a marked lack of uniformity is evident
3. If the distinctness of a variety is difficult to establish.

B. Reports

1. Progress Report

The SCA will report to the breeders after each growing season about the result of 1st year trial.

2. Final Report

This report will be prepared following the second test season. It will include collected results, a description of the variety and, if appropriate, a conclusion on how to distinguish this variety from other varieties.

C. Standards

1. Distinctness

To be judged as distinct, a variety must be seen to be clearly distinguishable, consistent and repeatable from any comparable variety in at least one character.

2. Uniformity

In the assessment of uniformity, variations observed in plots grown from collected/ submitted sample must normally be of demonstrable and repeatable order. Variation which is thought or prone to be due to environmental effects, is disregarded. In general varieties must not exceed the tolerated maximum variant plant number mentioned in the TG/1/3 of UPOV guidelines.

3. Stability

Plots exceeding the fixed tolerated variant plants are considered to indicate a lack of stability, which means, excessive lack of uniformity may imply lack of stability.

D. Characters

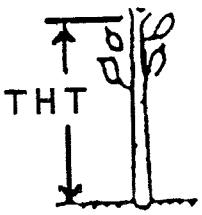
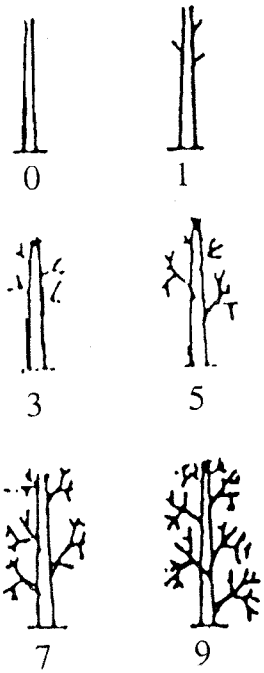
The following minimum list of characters in variety description and character stated described will be considered for the conduct of jute DUS tests:

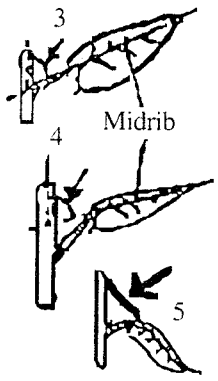
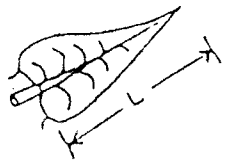
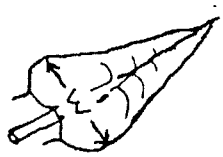
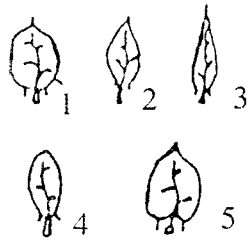
Table 9: List of characters in variety description for DUS test of Jute

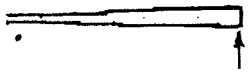
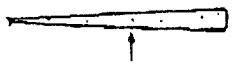
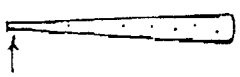
Sl No	Characters	Measurements of characters		Stages data collection
		Code	Guide	
1	Stem colour	G R	Green - no sign of any red pigmentation Red - includes the presence of a trace of red pigmentation	50-60 days age
2	Petiole colour	G R	Green Red	50-60 days age
3	Stipule shape	1 2 3	Scaly Filiform Foliaceous	50-60 days age
4	Stipule colour	G R TR	Green Red Tip red	50-60 days age
5	Leaf length-breadth ratio	Ratios of length & breadth	Average length and breadth ratio of 10 leaves starting from the 6th leaf from top of the main stem.	50-60 days age
6	Leaf shape	 1 2 3 4 5 6	Shape of 10 leaves as of sl No. 5 Ovate Ovate-Lanceolate Lanceolate Elliptical Cordate Other (specify)	50-60 days age
7	Leaf texture	S R	Smooth or glossy. Rough or non glossy	50-60 days age
8	Leaf margin	W N	Wavy Non wavy	50-60 days age
9	Pigmentation of flower buds (calyx))	G R	Green Red	At appearance of flower buds on all 10 plants
10	Days to first flowering	-	The date of opening of the first flower	At flowering stage
11	Days to flowering of 50% plants	-	Date of 50% flowering	At 50% flowering stage
12	Pigmentaion of fruits	G R	Green Red	At early flowering stage
13	Seed dispersal mechanism	1 2	Dehiscent Indehiscent	Before or during harvesting for seed
14	Seed coat colour	 1 2	Predominant colour by interpretation Brown Blue	After harvesting threshing and cleaning of seed
15	1000 seed weight	-	Actual weight at 10 % moisture content	Do
16	Any new character			

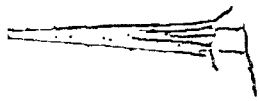
Table 10: Details of selected characters generally followed for describing jute, kenaf and mesta varieties are as follows :

DESCRIPTOR (ON PRINT OUT)	DESCRIPTION (FULL NAME)	CODE	GUIDE	GROWTH STAGE
1. COLLNO	COLLECTION NUMBER	e.g DS/../C BL/../C	Unique number assigned at the time of collection = Das & Sobhan (IJO mission I) = Basak & Li (IJO mission II) C= *Corchorus*	
2. SPP	SPECIES	CAP OLI	Name of species *C. capsularis* *C. olitorius*	
3. VARNM	VARIETY NAME		Name of released varieties i.e. refers, in this case, to variety used as standard check.	
4. SS	SEED SOURCE	KEN	Abbreviation of name of country from which the seed consignment was received. Kenya.	
5. ORI	COUNTRY OF ORIGIN	KEN BGD	Country from where the seed is known to have originated. A blank indicates that no information was given.	
6. SOWDAT	SOWING DATE	DDMMYY	Day, Month and Year of sowing e.g., 110588 = 11 May, 1988.	
7. STCO1	STEM COLOUR		Visual interpretation of colour at full vegetative expression.	60 days after sowing
	(first observation)	G R	Green-no sign of any red pigmentation Red-includes the presence of a trace of red pigmentation	
8. LFCO	LEAF LAMINA COLOUR	G R	Green-no sign of any red pigmentation Red-includes the presence of red pigmentation on leaf margin	60 days after sowing
9. VNCO	LEAF VEIN COLOUR	G R	Green Red	60 days after sowing
10. SNCO	BASAL SERRATION COLOUR	G R	Green Red	60 days after sowing
11. PTCO	LEAF PETIOLE COLOUR	G R	Green Red	60 days after sowing

DESCRIPTOR (ON PRINT OUT)	DESCRIPTION (FULL NAME)	CODE	GUIDE	GROWTH STAGE
12. STP	STIPULE 	 + O	Presence or absence of leaf stipule Stipulate (present) Exstipulate (absent)	60 days after sowing
13. STPCO	STIPULE COLOUR	G R TR	Green Red Tip red	60 days after sowing
14. THT	PLANT TECHNICAL HEIGHT 	**	The height (in cm) of the main stem measured from soil level to the point of forking	At pre-bud stage (i.e. at time of forking of stem, or before development of first flower bud in non branching types)
15. BRN	BRANCHING HABIT 	0 1 3 5 7 9	Non-branching - no growth of axillary bud Very weak Weak Intermediate Strong Very strong	At pre-bud stage based on relative development of axillary buds on main stem into branches with increasing levels of secondary and tertiary growth

DESCRIPTOR (ON PRINT OUT)	DESCRIPTION (FULL NAME)	CODE	GUIDE	GROWTH STAGE
16. LFAN	LEAF ANGLE 	 1 2 3 4 5 6 7 8 9	The angle between the stem and the line connecting the base and the centre of midrib of the leaf. 0-20° erect 21-40° 41-60° intermediate 61-80° 81-100 horizontal 101-120° 121-140°descending 141-160° 161-180°drooping	At pre-stage measure the 10 leaves starting from the 6th leaf from top of main stem (i.e. ignore first 5 leaves)
17. LFLN	LEAF LENGTH 	**	Average maximum length of 10 leaves (in cm) starting from the 6th leaf from top of main stem (i.e. ignore first 5 leaves	At pre-stage
18. LFWI	LEAF WIDTH 	**	Average maximum width (breadth) of 10 leaves (in cm) starting from the 6th leaf from top main stem (i.e. ignore first 5 leaves)	At pre-stage
19. LFAR	LEAF AREA	**	Average area (in sq.cm) of 10 leaves starting from the 6th leaf from top of main stem. Calculate from length and maximum breadth or use leaf area.	At pre-stage
20. LFSH	LEAF SHAPE 	 1 2 3 4 5 6	Shape of same 10 leaves as in Descriptor Ovate Ovate - lanceolate Lanceolate Elliptical Cordate Other (specify)	At pre -bud stage

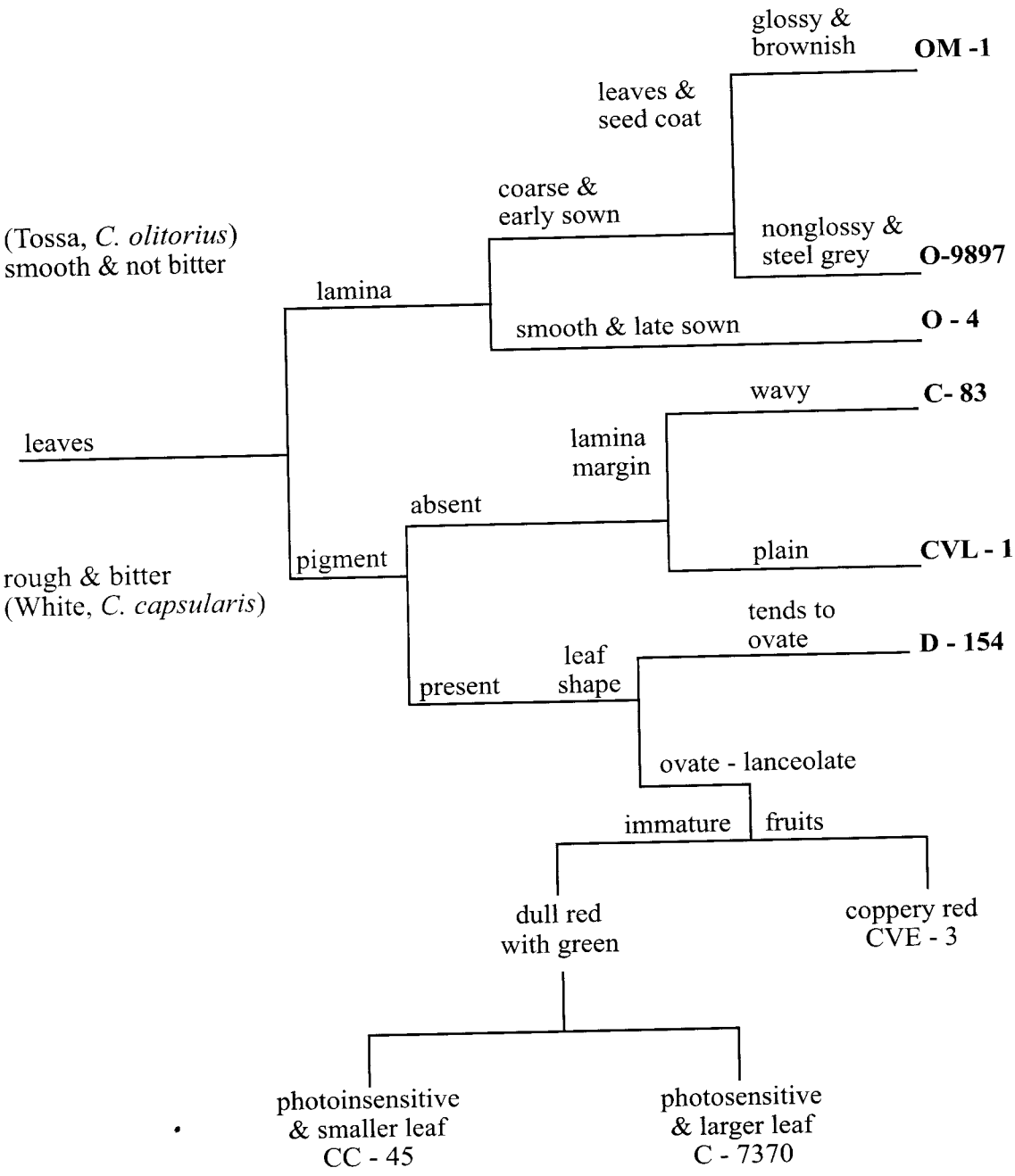
DESCRIPTOR (ON PRINT OUT)	DESCRIPTION (FULL NAME)	CODE	GUIDE	GROWTH STAGE
21. PTLN	PETIOLE LENGTH	**	Measurement in cm. using same 10 leaves as in Descriptor no. 17	At pre-bud stage
22. BUCO	PIGMENTATION OF FLOWER BUDS (CALYX)	G R	Green Red	At appearance of flower buds on all 10 plants
23. FLGDAT	FLOWERING DATE	DDMMYY	The date of opening of the first flower	At first flowering
24. MAT1	DAYS TO FIRST FLOWERING	**	The number of days from sowing to the opening of the first flower	At fist flowering
25. STCO2	STEM COLOUR (second observation)	G R	Green Red	At early fruiting stage before pod browning
26. FTCO	PIGMENTATION OF FRUIT	G R	Green Red	At early fruiting stage before pod browning
27. HARVDAT	DATE OF HARVESTING	DDMMYY		At harvesting stage (i.e. when 50% of pod have turned brown in colour)
28. MAT2	DAYS FROM SOWING TO HARVEST	**	Number of days from sowing to harvesting	At harvesting stage
29. NOD	NUMBER OF NODES AT MATURITY	**	Total number of nodes on main stem from soil surface to technical height	At harvesting stage
30. STD1	STEM DIAMETER-BASAL 	**	Measured (in mm) as close to soil surface as possible using slide calipers	At harvesting stage
31. STD2	STEM DIAMETER-MIDDLE 	**	Measured (in mm) at mid point between base and top	At harvesting stage
32. STD3	STEM DIAMETER-TOP 	**	Measured (in mm) at point of stem forking i.e. at technical height	At harvesting stage

DESCRIPTOR (ON PRINT OUT)	DESCRIPTION (FULL NAME)	CODE	GUIDE	GROWTH STAGE
33. CORDIAM	BASAL CORE DIAMETER 	**	Measured (in mm.) at same position as STD1 but after removal of outer bark to expose core (stick)	At harvesting stage
34. FBWT	DRY FIBRE WEIGHT	**	Average (in gm) of all 10 plants	After defoliation retting fibre extraction and drying of fibre
35. CRWT	DRY CORE WEIGHT	**	Average (in gm) of all 10 plants	After defoliation retting fiber extraction and drying of core (stick)
36. DIS	SEED DISPERSAL MECHANISM	1 2	Dehiscent Indehiscent	Before or during harvesting for seed
37. SCCO	SEED COAT COLOUR	 1 2	Predominant colour by visual interpretation Brown-most frequent in *C. capsularis* Blue-most frequent in *C. oplitorius*	After harvesting, threshing and cleaning of seed
38. 1000 SDWT	1000 SEED WEIGHT	**	Weight of 1000 seeds (in gm)	After harvesting, threshing, cleaning and drying to 10% moisture content

Notes:

** Enter actual measurement (in metric units) or counts.

KEY TO CURRENT VARIETIES OF JUTE IN BANGLADESH



Breeder Seed Unit
Breeding Division
Bangladesh Jute Research Institute

PROCEDURE OF DUS TESTS FOR KENAF AND MESTA

Introduction:

DUS test is essential for recognizing, distinguishing and describing a variety. The central theme is identification of a variety through the use of some parameters of characterization. DUS test is being followed in many countries of the world. In Bangladesh, this test has recently been made part of the variety release mechanism. The ultimate benefit of DUS test will centre around Plant Breeders Rights and specially the plant variety protection in view of the globalization of agribusiness. UPOV provides that procedure for conducting DUS test should be different for each species. The following procedures have been approved by NSB by the assessment of DUS tests in varieties of kenaf and mesta released and to be released. These procedures are to be followed by all concerned dealing with variety development and release.

I. DEFINITIONS

DUS : Distinctness, Uniformity and Stability.

Distinctness : The variety shall be deemed to be distinct if it is clearly distinguishing from any other variety whose existence is a matter of common knowledge at the time of application (for release of the variety).

Uniformity : A variety shall be deemed to be uniform if subject to variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics.

Stability : The variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation or in the case of a particular cycle of propagation at the end of each such cycle.

Plot : A test field of 500 plants in which seed will be sown in line at normal seed rate and spacing.

Comparative rows: One plot each of two or more varieties grown adjacent to each other at normal seed rate and spacing.

Reference sample : A sample of seed submitted/collected from the breeder of a variety used for conducting tests as well as for retaining a portion of the seed to represent the variety as reference stock. The seed is for official use only.

Off-type	:	Plants or seeds deviating clearly from the characteristics of a variety as described by the breeder in any observable respect.
Progeny row	:	A row of plant resulting from the sowing of seed from one plant in the following season.
NSB	:	National Seed Board.
Variety	:	A plant grouping within a single botanical taxon of the lowest known rank, which grouping can be: a) defined by the expression of the characteristic resulting from a given genotype; b) distinguished from any other plant grouping by the expression of at least one of the said characteristics; and c) considered as a unit with regard to its suitability for being propagated unchanged.

II. GENERAL DESCRIPTION

A. Test Period

Normally two consecutive years for which a proposed variety will be recommended. Tests may be continued for a third year if required.

B. Test Centre

The test work on each submission or collection (reference sample) will be carried out at the SCA. Field tests will be carried out in the SCA farm and laboratory tests in the Central Seed Testing Laboratory in Gazipur. If this site is not suited for field testing of certain varieties of Kenaf/Mesta then tests will be conducted by SCA in suitable research station appropriate part of the country.

C. Material required

Test materials to be submitted or collected only in the first year of testing.

1. Quantity: Kenaf/Mesta seed: 2 kg for released varieties.
   500-600gms. for to be released varieties.
2. Submission of materials:
   The quantity of material mentioned should be submitted to the SCA with a label inside and outside the container of seed and an accompanying letter stating exactly the same information. The information on the labels and in the letter should mention at least:

a) Name of the sender with official designation
b) Reference number of the sample
c) Name of the organization responsible for maintaining that particular variety
d) Name of the variety/line of the seed
e) Growing season
f) Quantity of seed
g) Date and place of sampling
h) Month and year of harvest
i) Nature and quantity of preservative, if any, added to the sample
j) Germination % as on (date)

3. The sample should be in the possession of SCA on or before the following dates:
   a) Kenaf: *Hibiscus cannabinus L.* on or before the 15th January
   b) Mesta: *Hibiscus sabdariffa L.* on or before the 15th February
4. In case of pre-released variety the sample should be submitted to SCA one season before submission of application for release.
5. A descriptive list (as per agreed upon) filled up by breeder and a pair-wise distinctive list of characters of most similar variety/varieties should be submitted.

D. Division of Material

The submitted or collected sample may be divided into 10:10:80 ratio of the quantity. The larger quantity will be preserved as the reference sample.

E. Test Layout

1. Year 1.

A plot containing 500 normal plants should be grown at normal seed rate and spacing. There will be another set with either fifteen days interval in planting or grown in a different location.

2. Year 2

A plot containing 500 normal plants should be grown at normal seed rate and spacing from the same seed lot used in the first year. There will be another set with either fifteen days interval or in a different location. Plant-to-row of variant plants will be grown to compare these plants with the plants grown from the reference sample.

3. Year 3

Same as year 2 (if necessary).

F. Comparative row test (if necessary)

A Test with a few rows of very similar varieties of a crop are to be conducted each year side by side with the candidate variety.

III. TEST METHODS

For conduction of the test, the latest UPOV published guidelines and instructions are to be followed. Characters will be routinely recorded and verified throughout the growing period by the SCA personnel as explained in the test guidelines and consequently a complete description of varieties will be prepared.

A. Year 1

Laboratory and field observation tests will be carried out to provide data on uniformity and for classification purposes.

1. Distinctness

Descriptive records will be verified from submitted or collected materials and from harvested materials. The differences will be recorded and provisional description will be prepared.

2. Uniformity

Plants from submitted or collected materials will be required to comply with uniformity standards indicated in TG/1/3 or UPOV publication standard.

Off-type plants will be detected and the characters in which they differ from the normal plants will be recorded. In general, the assessment of differences between variant plants and majority plants will be based on the level of differences required to differentiate between varieties. When confirmation of the characters of suspected off-types is required, off-type plants and majority plants will be harvested, threshed and grown in the following appropriate season.

3. Stability

No specific test will be carried out but stability may be inferred from the plots by noting variation and segregation within the plots grown from the collected or submitted sample.

B. Year 2

Laboratory and field observations will be carried out as in year 1.

1. Distinctness

Data obtained from first year observations will be compared with the data of second year plots of the same variety. In addition, descriptive records will be prepared to supplement the first year's provisional report.

2. Uniformity

The observations made in the 2nd year will be used to confirm the provisional report prepared in the first year.

IV. VISIT TO TEST CENTRE

The breeders are encouraged to visit the test centre by arrangement to view their materials and discuss with SCA.

IV. REPORTING PROCEDURE

A. At the following stages a written summary of the data will be submitted by the SCA to the breeders.

1. If laboratory test show a marked lack of uniformity and purity.
2. If during field observation a marked lack of uniformity is evident.
3. If the distinctness of a variety is difficult to establish.

B. Reports

1. Stop work Report

In case where collected or submitted sample has been found to be unsatisfactory in terms of non-compliance with materials requirements, laboratory standard. Or early field observations, a summary report of the results will be prepared with a recommendation of discontinuation of work and communicated to the breeder and Seed Wing (MoA).

2. Progress report

The SCA will report to the breeders after each growing season about the results of 1st year trial.

3. Final Report

This report will be prepared following the second test season. It will include collected results, a description of the variety and if appropriate, a conclusion on how to distinguish this variety from other varieties.

C. Standards

1. Distinctness

To be judged as distinct, a variety must be seen to be clearly distinguishable, consistent and repeatable from any comparable variety in at least one character.

2. Uniformity

In the assessment of uniformity, variations observed in plots grown from collected/submitted sample must normally be of demonstrable and repeatable order. Variation which is thought or prone to be due to environmental effects is disregarded.

In general, Varieties must not exceed the tolerated maximum variant plant number mentioned in the TG/1/3 of UPOV guidelines.

3. Stability

Plots exceeding the fixed tolerated variant plants are considered to indicate a lack of stability, which means, excessive lack of uniformity may imply lack of stability.

D. Characters

The following minimum list of characters in variety description and character stated described will be considered for the conduct of Kenaf and Mesta DUS tests.

Table 11: List of characters in variety description for DUS test of Kenaf & Mesta

Sl. No.	Characters	Measurements of characters		Stages data collection
		Code	Guide	
1	Stem colour	G	Green-no sign of any red/ purple Pigmentation	50-60 days age
		R	Red- includes the presence of a red pigmentation	
		P	Purple-includes the presence of a purple pigmentation	
		RG	Reddish green	
		PG	Purplish green	
		GrP	Green with reddish patches	
		PbGa	Purple below greenish above	
		RaGb	Reddish above greenish below	
2	stem pubescence	1	Smooth	Pre-bud
		2	Hairy	
		3	Prickly	
3	Leaf shape	1	Unlobed	First bud stage (i.e at appearance of first visible bud on main stem). Measure first 10 leaves from this point downwards
		2	Partially lobed	
		3	Deeply lobed	
		4	Mixed	
4	Leaf length-breadth ratio	Rations of length and breadth	Average length and breadth ratio of 10 leaves starting from the 6th leaf from top of the main stem	50-60 days age.

5	Leaf colour (lamina)	1 2 3 4 5 6	Pale green Green Deep green Reddish green Purplish green Red	50-60 days age
6	Leaf texture	1 2 3	Smooth or glossy Ventral glabrous (hairless), dorsal hairy Ventral glabrous, dorsal prickly	50-60 days age
7	Leaf pubescence	 0 1	Presence of prickles and hairs on upper and lower surface of leaf Absent Present	First bud stage
8	Petiole colour	1 2 3 4 5	Green Red Reddish Purple/Purplish Upper reddish/purplish, lower greenish	50-60 days age
9	Petiole length		Average length of 10 leaves starting from the 6th leaf from top of the main stem	50-60 days age
10	Stipule colour	G R TR	Green Red Tip red	50-60 days age
11	Stipule shape	1 2 3	Scaly Filiform Foliaceous	50-60 days age
12	Flower colour	1 2 3 4 5	Cream/yellow with purple centre Completely cream/yellow Cream with purplish venation and centre Pink with purple centre Purple	At mid flowering stage

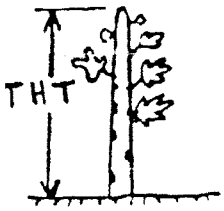
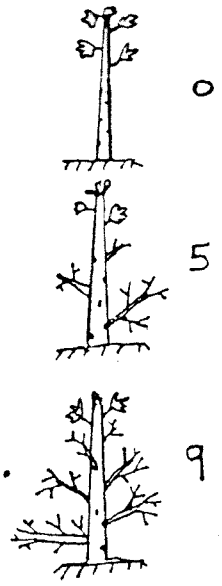
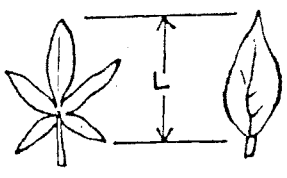
13	Anther colour	1 2	Yellow Purplish	At mid flowering stage
14	Pigmentation of flower bud (calyx)	1 2 3	Green Green with reddish spots Light red	At bud stage
15	Days to first flowering		The date of opening of the first flower	At flowering stage
16	Days to flowering of 50% plants		Date of 50% flowering (1st flowering in 50% plants in the plot)	At 50% flowering stage
17	Pigmentation of fruits (calyx and epicalyxes)	1 2 3	Green Green with reddish spots Red	At early fruiting stage before capsule browning
18	Fruit shape	1 2 3	Globular (Round) Ovoid (Egg shaped) Pointed (Elongated)	At harvesting stage
19	Fruit pubescence	1 2 3	Smooth Hairy Bristled	At harvesting stage
20	Seed dispersal mechanism	1 2	Dehiscent Indehiscent	Before or during harvesting for seed
21	Days to maturity		The date of 60-70% fruits browning	At harvesting stage
22	Seed shape	1 2 3	Reniform Sub-reniform Angular	After harvesting, threshing cleaning of seed
23	Seed coat colour	1 2 3	Ash grey Blackish Brownish	-Do-
24	1000 seed weight		Actual weight at 10% moisture content	-Do-
25	Any new character			

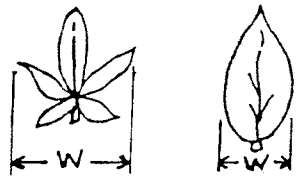
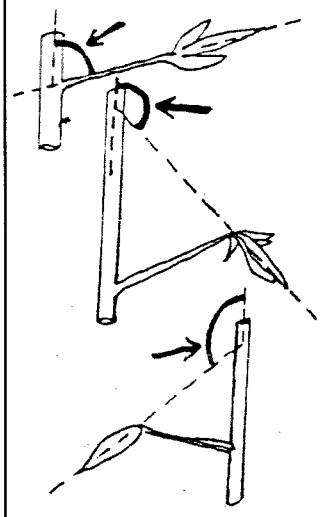
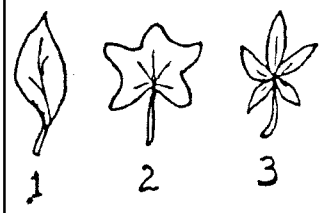
INTERNATIONAL JUTE ORGANISATION
GERPLASM PROJECT

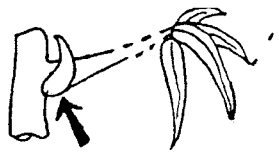
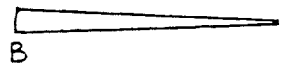
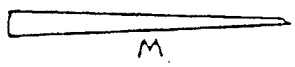
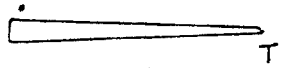
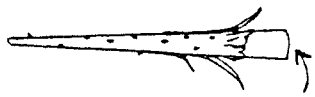
Table 12: Key to descriptors and descriptor States For Characterisation of Kenaf & Mesta

DESCRIPTOR (ON PRINT OUT)	DESCRIPTOR (FULL NAME)	CODE*	GUIDE	GROWTH STAGE
1. INST	INSTITUTE		Name of institute responsible for characterisation	
		BJRI	Bangladesh Jute Research Institute	
		FCRI	Field Crops Research Institute, Thailand	
		IBFC	Institute of Best Fibre Crops, China	
		CRIJAF	Central Research Institute for Jute & Allied Fibres	
		JDTC	Jute Development and Trading Corporation, Nepal	
		RITFC	Research Institute for Tobacco & Fiber Crops, Indonesia	
2. CGRNO	Resgistration number assigned to each accession in IJO Centralised Germplasm Repository, Dhaka		A unique number which is never changed or re-assigned. This number should be used when requesting information on IJO germplasm.	
3. DESIG.	DESIGNATION		Number assigned to each accession in national gene bank of country or by donor of seed ie. Plant Introduction number (PI) of the USDA, Comnonwealth Plant Introduction number (CPI) of Australia, etc.	

DESCRIPTOR (ON PRINT OUT)	DESCRIPTOR (FULL NAME)	CODE*	GUIDE	GROWTH STAGE
4. COLLNO	COLLECTION NUMBER	DS/.../H BL/.../H	Unique number assigned at the time of collection = Das & Sobhan (IJO mission I) = Basak & Li (IJO mission II) *H= Hibiscus*	
5. SPP	SPECIES	CAN	Name of species *cannabinus*	
6. VARNM	VARIETY NAME		Name of released variety i.e. refers, in this case, to varity used as standard check	
7. SS	SEED SOURCE	KEN	Abbreviation of name of country from which the seed consignment was received Kenya (see: Standard List of IBPGR Country Abbreviations.)	
8. ORI	COUNTRY OF ORIGIN	KEN BGD	Country from where the seed is known to have originated. A blank indicates that no information was given	
9. SOWDAT	SOWING DATE	DDMMYY	Day, Month and Year of sowing e.g. 150588 =15 May, 1988	
10. FLGDAT	FLOWERING DATE	DDMMYY	The date of opening of the first flower	At first flowering
11. MAT1	DAYS TO FIRST FLOWERING	**	The number of days from sowing to the opening of the first flower.	At first flowering

DESCRIPTOR (ON PRINT OUT)	DESCRIPTOR (FULL NAME)	CODE*	GUIDE	GROWTH STAGE
12. HARVDAT	DATE OF HARVEST	DDMMYY		At harvesting stage (i.e. when 50% of capsules have turned brown in colour) ***
13. MAT2	DAYS FROM SOWING TO HARVEST	**	Number of days from sowing to harvesting	ditto
14. THT	PLANT TECHNICAL HEIGHT 	**	Total plant height from base to top including all flowering nodes.	At harvesting stage
15. BRN	BRANCHING HABIT AT PRE-BUD STAGE 	0 1 3 5 7 9	Non-branching...no growth of axillary bud Very weak Weak Intermediate Strong Very strong	At pre-bud stage Based on relative development of axillary buds on main stem into branches with increasing levels of secondary and tertiary growth.
16. FLN	LEAF LENGTH 	**	Averge maximum length of 10 leaves (in cm.) starting from the 6th leaf from top of main stem (i.e. ignore first 5 leaves)	At pre-bud stage

DESCRIPTOR (ON PRINTOUT)	DESCRIPTOR (FULL NAME)	CODE*	GUIDE	GROWTH STAGE
17. LFWI	LEAF WIDTH 	**	Average maximum width (breadth) of 10 leaves (in cm) from the 6th leaf from the top of main stem (i.e. ignore first 5 leaves)	at per-bud stage
18. LFAN	LEAF ANGLE 	1 2 3 4 5 6 7 8 9	The angle between the stem and the line connecting the base and the centre of midrib of the leaf. Using same 10 leaves as in Descriptor no. 16. 0-20°... erect 21-40° 41-60°...intermediate 61-80° 81-100°....horizontal 101-120°... 121-140°...descending 141-160° 161-180°...drooping	at per-bud stage
19. LFSH	LEAF SHAPE 	1 2 3 4	= Unlobed = Partially lobed = Deeply lobed = Mixed	First bud stage (i.e. at appearance of first visible bud on main stem). Measure first 10 leaves from this point downwards
20. LFPB	LEAF PUBESCENCE	0 1	Presence of prickles and hairs on upper and lower surface of leaf = Absent = Present	First bud stage

DESCRIPTOR (ON PRINT OUT)	DESCRIPTOR (FULL NAME)	CODE*	GUIDE	GROWTH STAGE
21. STP	STIPULE 	1 2	Presence or absence of leaf stipule Stipulate (present) Exstipulate (absent)	At 60 days after sowing
22. PTLN	PETIOLE LENGTH	**	Measurement in mm. using same 10 leaves as in Descriptor no. 16	At pre-bud stage
23. STPB	STEM PUBESCENCE	1 2 3	Presence and type of pubescence on stem surface = Smooth = Hairy = Prickly	Pre-bud
24. STD1	STEM DIAMETER-BASAL 	**	Measured (in mm.) as close to soil surface as possible using slide calipers	At harvesting stage
25. STD2	STEM DIAMETER-MIDDLE 	**	Measured (in mm.) at mid point between base and top	at harvesting stage
26. STD3	STEM DIAMETER-TOP 	**	At technical height on main stem (in mm.)	At harvesting stage
27. CORDIAM	BASAL CORE DIAMETER 	**	Measured in mm at same position as STD1 but after removal of outer bark	At harvesting stage
28. NOD	NUMBER OF NODES AT MATURITY	**	Total number of nodes on main stem from soil surface to top including flowering nodes.	At harvesting stage

DESCRIPTOR (ON PRINT OUT)	DESCRIPTOR (FULL NAME)	CODE*	GUIDE	GROWTH STAGE
29. STCO1	PIGMENTATION OF STEM AT 60 DAYS AFTER SOWING		Green Or Red	Two months (60 days) after sowing
30. STCO2	PIGMENTATION OF STEM AT MATURITY		As for descriptor no. 29	At early fruiting stage before capsule browing
31. LECO	PIGMENTATION OF LEAF LAMINA AT 60 DAYS AFTER SOWING		- do -	60 days after sowing
32. VNCO	PIGMENTATION OF LEAF VEINS AT 60 DAYS AFTER SOWING		- do -	60 days after sowing
33. PTCO	PIGMENTATION OF PETIOLE AT 60 DAYS AFTER SOWING		- do -	60 days after sowing
34. STPCO	PIGMENTATION OF STIPULES AT 60 DAYS AFTER SOWING		- do -	60 days after sowing
35. BUCO	PIGMENTATION OF FLOWER BUDS (CALYX)		- do -	At appearance of buds on all 10 plants

DESCRIPTOR (ON PRINT OUT)	DESCRIPTOR (FULL NAME)	CODE*	GUIDE	GROWTH STAGE
36. FLCO	FLOWER COLOUR (COROLLA)		As for descriptor no. 29	At mid-flowering stage
37. FTCO	PIGMENTATION OF FRUIT (CALYX AND EPICALXY)		-do-	At early fruiting stage before capsule browning
38. FTPB	FRUIT PUBESCENCE	1 2 3	Presence and type of pubescence on surface of capsule = Smooth = Hairy = Bristled	At harvesting stage
39. DIS	SEED DISPERSAL MECHANISM	1 2	Dehiscent Indehiscent	Before or during harvesting for seed
40. SCCO	SEED COAT COLOUR		Brown or grey As for descriptor no. 29	After harvesting, threshing and clean -ing of seed
41. SSHP	SEED SHAPE 	1 2 3	= Reniform = Sub-reniform = Angular	After harvesting, threshing and clean -ing of seed
42. 1000	1000 SEED WEIGHT	**	Weight of 1000 seeds (in gm).	After harvesting, threshing, cleaning and drying to 10% moisture content

DESCRIPTOR (ON PRINT OUT)	DESCRIPTOR (FULL NAME)	CODE*	GUIDE	GROWTH STAGE
43. FBWT	DRY FIBRE WEIGHT	**	Average (in gm.) of all 10 plants.	After defoliation, retting, fibre extraction and drying of fibre
44. CRWT	DRY CORE WEIGHT	**	Average (in gm.) of all 10 plants	After defoliation, retting, fibre extraction and drying of (stick)

Notes :

* All scores will be averages (x) of 10 plants, unless otherwise indicated.

** Enter actual measurements (in metric units) or counts.

PROCEDURE OF DUS TESTS FOR POTATO

Introduction:

DUS test is essential for recognizing distinguishing and describing a variety. The central theme is identification of a variety through the use of some parameters of characterization, DUS test is being followed in many countries of the world. In Bangladesh, this test has recently been made part of the variety release mechanism. The ultimate benefit of DUS test will centre around Plant Breeders Rights and specially plant variety protection in view of the globalization of agribusiness. UPOV provides that procedure for conducting DUS Test should be different for each species. The following procedures have been approved by NSB to perform DUS tests of potato varieties both released and to be released. These procedures are to be followed by all concerned dealing with variety development and release.

I. DEFINITIONS:

DUS : Distinctness, Uniformity & Stability.

Distinctness : The Variety shall be deemed to be distinct if it is clearly distinguishable from other whose existence is a matter of common knowledge at the time of the filing of the application (for release of the variety).

Uniformity : A variety shall be deemed to be uniform if subject to variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics.

Stability : The variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation, or in the case of particular cycle of propagation at the end of each such cycle.

Plot : A test field of 120 plants in two replications should be grown at normal seed rate and spacing.

II. GENERAL DESCRIPTION

A. Test period

Normally two consecutive years for which proposed variety will be recommended. Tests may be continued for a third year if required.

B. Test Centre

The test work on each submission or collection (reference sample) will be carried out at the SCA. Field tests will be curried out in the SCA farm and laboratory, tests in the Central Seed Testing Laboratory in Gaizpur. If this site is not suited for field testing of certain varieties of potato then the tests will be conducted by SCA in a suitable research station appropriate part of the country.

C. Material required

1. Quantity: 200 tubers/15 grams of True Potato Seed (TPS) in each year of Testing.

2. Submission of Material:

   The quantity of material mentioned should be submitted to the SCA with a label inside and outside with the container of seed/supplying bag and an accompanying letter stating exactly the same information The information of the labels and in the letter should mentioned at least:

   a) Name of the sender with official designation
   b) Reference number of the sample
   c) Name of the organization responsible for maintaining that particular variety
   d) Name of the variety/line of the seed
   e) Growing season with year
   f) Quantity of tubers/seeds
   g) Date and place of sampling
   h) Date and year of planting/sowing and harvesting
   i) Nature and quantity of seed treatment chemicals, if any, added to the sample
   j) Germination % as on date (in case of TPS)
   k) Others, if any.

3. The sample should be in the possession of SCA on or before the following dates:
   (a) On or before 2nd week of October
4. Incase of pre-released variety the sample should be submitted to SCA one season before submission of application for release.

5. A descriptive list (as per agreed upon) filled up by the breeder & a pair-wise distinctive list of characters of most similar variety/varieties should be submitted.

D. Division of Material

The submitted or collected sample may be divided into as per requirement for field and laboratory test.

E. Test Layout

1. Year 1

A plot containing 60 normal plants should be grown at normal seed rate and spacing. There will be another set with either ten days interval in planting or grown in a different location.

2. Year 2

Same as 1st year.

3. Year 3

Same as 1st year (if necessary).

F. Comparative row test (if necessary)

A test with a few rows of very similar varieties of a crop are to be conducted each year side by side with the candidate variety. The breeders/applicant will specify the variety.

III. TEST METHODS

For the conduct of test the latest UPOV published guidelines and instructions are to be followed. Characters will be routinely recorded and verified throughout the growing period by the SCA personnel as is explained in the test guidelines and consequently a complete description of varieties will be prepared.

A. Year 1

Laboratory and field observation tests will be carried out to provide data on distinctness, uniformity and other important characteristics.

1. Distinctness

Descriptive records will be verified from submitted or collected material and from harvested material. The differences will be recorded and a provisional description will be prepared.

2. Uniformity

Plants from submitted or collected materials will be required to comply with uniformity standards indicated in TG/1/3 and TG/23/5 of UPOV publication standard.

Off-type plants will be detected and the character in which they differ from the normal plants will be recorded. In general the assessment of differences between variant plants and majority plants will be based on the level of differences required to differentiate between varieties.

When confirmation of the characters of suspected off-types is required, off-type plants and majority plants will be harvested, and grown in the following appropriate season.

3. Stability

Stability may be inferred from the plots by noting variation and segregation within the plots and over generation grown from the collected or submitted sample.

B. Year 2

Laboratory and field observations will be carried out as in year 1.

1. Distinctness

Data obtained from first year observations will be compared with the data of second year's plots of the same variety under similar agronomic condition. In addition, descriptive records will be prepared to supplement the first year's provisional report.

2. Uniformity

The observations made in the 2nd year will be used to confirm the provisional report prepared in the first year.

IV. VISIT TO TEST CENTRE

The breeders/applicant are encouraged to visit the test centre to view their material and discuss with SCA. DUS Tests personnel of SCA can also visit the breeders trial plots if necessary.

V. REPORTING PROCEDURE

A. At the following stages a written summary of the data will be informed by the SCA to the breeders/applicant.

1. If the tests show a marked lack of purity and uniformity.
2. If the distinctness of a variety is difficult to establish.

B. Report

1. Progress Report

The SCA will report to the breeder/applicant after each growing season about the results of 1st year trial.

2. Final Report

This report will be prepared following the second test season. It will include collected result, a description of the variety and, if appropriate, a conclusion on how to distinguish variety from other varieties.

C. Standards

1. Distinctness

To be judged as distinct, a variety must be seen to be clearly distinguishable, consistent and repeatable, from any comparable variety in at least one character.

2. Uniformity

In the assessment of uniformity variations observed in plots grown from collected submitted sample must normally be of demonstrable and repeatable order. Variation which is thought or prone to be due to environmental effects is disregarded. In general, varieties must not exceed the tolerated maximum variant plant number mentioned in the TG/1/3 & TG/23/5 of UPOV guidelines.

3. Stability

Plot exceeding the fixed tolerated variant plants are considered to indicate a lack of stability, which means, excessive lack of uniformity may imply lack of stability.

D. Characters

The characters in variety description and character states described will be based on those outlined in the UPOV (TG/23/5) guidelines for the conduct of DUS Tests.

Minimum list of characters to describe potato plants *(Solanum tuberosum L.)*

	Character	Observation stage
* 1.	Light sprout: size Code 3 for small Code 5 for medium Code 7 for large	Stage 1 (Light sprout)
** 2.	Light sprout: shape Code 1 for spherical Code 2 for ovoid Code 3 for conical Code 4 for broad cylindrical Code 5 for narrow cylindrical	Stage 1 (Light sprout)
** 3.	Light sprout: anthocyanin colouraion of base Code 1 for red-violet Code 2 for blue-violet	Stage 1 (Light sprout)
**4.	Light sprout: intensity of anthocyanin colouration of base Code 1 for very weak Code 3 for weak Code 5 for medium Code 7 for strong Code 9 for very strong	Stage 1 (Light sprout)
** 5.	Light sprout: pubescence of base Code 1 for very weak Code 3 for weak Code 5 for medium Code 7 for Strong Code 9 for very strong.	Stage 1 (Light sprout)
06.	Light sprout: size of tip Code 1 for very small Code 3 for small Code 5 for medium Code 7 for large Code 9 for very large	Stage 1 (Light sprout)
07.	Light sprout: habit of tip Code 3 for closed Code 5 for medium Code 7 for open	Stage 1 (Light sprout)

*8.	Light sprout: intensity of anthocyanin colouration of tip Code 1 for very weak Code 3 for weak Code 5 for medium Code 7 for strong Code 9 for very strong	Stage 1 (Light sprout)
*9.	Light sprout: pubescence of tip Code 1 for absent or very weak Code 3 for weak Code 5 for medium Code 7 for strong. Code 9 for very strong.	Stage 1 (Light sprout)
010.	Light sprout: number of root tips Code 3 for few Code 5 for medium Code 7 for many	Stage 1 (Light sprout)
011.	Light sprout: protrusion of lenticels Code 3 for few Code 5 for medium Code 7 for strong	Stage 1 (Light sprout)
012.	Light sprout: length of lateral shoots Code 3 for short Code 5 for medium Code 7 for long	Stage 1 (Light sprout)
*13.	Plant: height Code 1 for very short Code 3 for short Code 5 for medium Code 7 for tall Code 9 for very tall	Stage 2
*14.	Plant: type Code 1 for stem-type Code 2 for intermediate-type Code 3 for leaf-type	Stage 2
*15.	Plant: growth habit Code 3 for erect Code 5 for semi-erect Code 7 for spreading	Stage 2
*16.	Stem: thickness of main stem Code 3 for thin Code 5 for medium Code 7 for thick	Stage 2
**17.	Stem: extension of anthocyanin colouration Code 1 for absent or very weak Code 3 for weak Code 5 for medium Code 7 for strong Code 9 for very strong	Stage 2

*18.	Leaf: size Code 1 for very small Code 3 for small Code 5 for medium Code 7 for large Code 9 for very large	Stage 2
*19.	Leaf: silhouette Code 3 for closed Code 5 for medium Code 7 for open	Stage 2
*20.	Leaf: intencity of green colour Code 3 for light Code 5 for medium Code 7 for dark	Stage 2
*21.	Leaf: extension of anthocyanin colouration of midrib Code 3 for weak Code 5 for medium Code 7 for strong Code 9 for very strong	Stage 2
**22.	Leaflet: size Code 1 for very small Code 3 for small Code 5 for medium Code 7 for large Code 9 for very large	Stage 2
*23.	Leaflet: width Code 3 for narrow Code 5 for medium Code 7 for broad	Stage 2
*24.	Leaflet: frequency of (+) coalescence Code 3 for low Code 5 from medium Code 7 for high	Stage 2
**25.	Leaflet: waviness of margin Code 1 for none or very weak Code 3 for weak Code 5 for medium Code 7 for strong Code 9 for very strong	Stage 2
26.	Leaflet: depth of veins Code 3 for shallow Code 5 for medium Code 7 for deep	Stage 2
*27.	Leaflet : anthocyanin pigmentation of blade of young leaflets at appical rosette Code 1 for absent Code 9 for present	Stage 2

*28.	Leaflet: glossiness of the upper-side Code 3 for dull Code 5 for medium Code 7 for glossy	Stage 2
*29.	Leaf (midrib): frequency of secondary leaflets Code 1 for nil or very low Code 3 for low Code 5 for medium Code 7 for high Code 9 for very high	Stage 2
*30.	Terminal leaflet: frequency of secondary leaflets Code 1 for nil or very low Code 3 for low Code 5 for medium Code 7 for high Code 9 for very high	Stage 2
*31.	Lateral leaflet: frequency of secondary leaflets Code 1 for nil or very low Code 3 for low Code 5 for medium Code 7 for high Code 9 for very high	Stage- 2
*32.	Lateral leaflet: size of secondary leaflet Code 3 for small Code 5 for medium Code 7 for large	Stage 3
033.	Inflorescence: size of inflorescence Code 3 for small Code 5 for medium Code 7 for large	Stage 3
034.	Inflorescence: anthocyanin colouration of peduncle Code 1 for absent or very weak Code 3 for weak Code 5 for medium Code 7 for strong Code 9 for very strong	Stage 3
035.	Plant: frequency of flowers Code 1 for nil or very low Code 3 for low Code 5 for medium Code 7 for high Code 9 for very high	Stage 3
036.	Flower: anthocyanin colouration of bud Code 1 for absent or very weak Code 3 for weak Code 5 for medium Code 7 for strong Code 9 for very strong	Stage 3

037.	Flower corolla: size Code 1 for very small Code 3 for small Code 5 for medium Code 7 for large Code 9 for vary large	Stage 3
038.	Flower corolla: colour of inner side Code 1 for white Code 2 for red-violet Code 3 for blue-violet	Stage 3
039.	Flower corolla : intensity of anthocyanin colouration of inner side in coloured flower Code 1 for absent or very weak Code 3 for weak Code 5 for medium Code 7 for strong Code 9 for very strong	Stage 3
040.	Flower corolla : anthocyanin colouration of outer side in white flower. Code 1 for absent Code 9 for present	Stage 3
041.	Flower corolla: size of white tips in coloured flower Code 3 for small Code 5 for medium Code 7 for large	Stage 3
042.	Plant: frequency of fruits Code 1 for absent or very few Code 3 for few Code 5 for medium Code 7 for many Code 9 for very many	Stage 4
*43.	Plant: time of maturity Code 1 for very early Code 3 for early Code 5 for medium Code 7 for late Code 9 for very late	Stage 4
**44.	Tuber: shape Code 1 for round Code 2 for short-oval Code 3 for oval Code 4 for long oval Code 5 for long Code 6 for very long	Stage 5
*45.	Tuber: depth of eyes Code 1 for very shallow Code 3 for shallow Code 5 for medium Code 7 for deep Code 9 for very deep	Stage 5

*46. Tuber: smoothness of skin — Stage 5
Code 3 for smooth
Code 5 for medium
Code 7 for rough

**47. Tuber: colour of skin — Stage 5
Code 1 for yellow
Code 2 for red
Code 3 for blue
Code 4 for red parti-coloured
Code 5 for blue parti-coloured

*48. Tuber: colour of base of eye — Stage 5
Code 1 for yellow
Code 2 for red
Code 5 for blue

**49. Tuber: colour of flesh — Stage 5
Code 1 for white
Code 2 for cream
Code 3 for light yellow
Code 4 for yellow
Code 5 for dark yellow

050. Yellow: skinned varieties only: — Stage 5
Tuber : anthocyanin colouration of skin in reaction to light
Code 1 for absent of very weak
Code 3 for weak
Code 5 for medium
Code 7 for strong
Code 9 for very strong

(*&**) These 32 characters are important in Bangladesh condition including 10 (**) characters mentioned in UPOV Guide line (TG/23/5).

O Not so important or feasible for Bangladesh. However if necessary: These characters may be considered & recorded.

PROCEDURE OF DUS TESTS FOR SUGARCANE

Introduction:

DUS test is essential for recognizing, distinguishing and describing a variety. The purpose of the procedure is to harmonize examination of distinctness (D), uniformity (U) and stability (S) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions. The main theme is identification of a variety through use of some characterization parameters. DUS test is being followed in many countries of the world. In Bangladesh, this test has been taken as a part of the variety release mechanism. The ultimate benefit of DUS test will centre on Plant Breeders' Rights, especially plant variety protection in view of globalization. UPOV provides that the procedure for conducting DUS test should be different for each species. The procedure of DUS testing of new varieties includes testing in the trial field and laboratory that must be conducted according to general procedural guidelines and in accordance with requirements of the UPOV. The following procedure has been developed for the evaluation by the technical committee and final approval of the NSB. This procedure should be applicable for the assessment of DUS in sugarcane varieties already released and to be released.

I. DEFINITIONS

DUS	: Distinctness, Uniformity & Stability.
Distinctness	: The variety shall be deemed to be distinct if it is clearly distinguishing from any other variety whose existence is a matter of common knowledge at the time of application.
Uniformity	: The variety shall be deemed to be sufficiently uniform if, subject to variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics.
Stability	: The variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation or in the case of a particular cycle of the propagation, at the end of each cycle.
Plot	: A test field of 80 plants in two replications should be grown at normal seed rate and spacing.

II. GENERAL DESCRIPTION

A. Test Period

The duration of tests shall normally be at least two independent growing seasons. Tests may be continued for a third year if required.

B. Test Centre

The field shall be conducted at the SCA and laboratory tests in the Variety Testing Laboratory in Gazipur. In case of test conducted at more than one place, suitable place at on station of SCA or research institute shall be selected.

C. Material required

Test material to be submitted or collected only in the first year of testing.

1. Quantity:

Test quantity of plant material to be supplied by the applicant should be 170 segments of stalk used for vegetative propagation of sugarcane with 3 buds each.

2. Submission of Material:

The quantity of material mentioned should be submitted to the SCA with properly labeled and accompanying letter stating exactly. The information on the labels and in the letter should mention at least:

a) Name of the sender with official designation
b) Reference number of the sample
c) Name of the organization responsible for maintaining that particular variety
d) Name of the variety/line of the seed
e) Planting time
f) Quantity of seed

3. The sample should be in the possession of SCA on or before the 2nd week of October.

4. A descriptive list (as per agreed upon) filled up by breeder and a pair wise distincitive list of characters of most similar variety/verieties should be submmitted.

D. Division Of Material

The submitted or collected samples may be divided as per requirements for filed and laboratory test.

E. Test layout

1. Year 1

The following design shoulld be followed:

Number of rows	4
Row length	6 m
Row to row distance	90 cm
Plant to plant distance	60 cm
Number of replications	2
Number of plants	80

There will be another set planting with 10-15 days interval.

2. Year 2

Same as 1st year

3. Year 3

Same as 1st year (if necessary)

F. Comparative row test (if necessary)

Tests with a few rows of very similar varieties of the crop are to be conducted each year side by side with the candidate variety.

III. TEST METHODS

The tests are to be conducted following the latest UPOV published guidelines and instructions. Characters will be routinely recorded and verified throughout the growing period by the SCA personnel as is explained in the test guideline and consequently a complete description of varieties will be prepared.

Sometimes it is difficult to identify a variety based on morphological appearance only, particularly for new varieties. In this case, a more reliable and unambiguous means of identification is necessary. Thus, molecular markers in facilitating DUS testing have gained acceptance. DNA markers are also becoming increasingly important in the protection of new varieties through Plant Breeders' Right. However, if necessary application of molecular techniques for DUS test of sugarcane may be applied maintaining the standards indicated in BMT-TWA/sugarcane/2/2 of UPOV guideline. DNA marker testing facilities to be developed as per the guideline of UPOV.

A. Year 1

Laboratory and field tests will be carrid out to provide data on Distinctness, Uniformity and other important characteristics.

1. Distinctness

Descriptive records will be verified from submitted or collected material and from harvested material. The differences will be recorded and a provisional description will be prepared.

2. Uniformity

Plants from submitted or collected materials will be required to comply with uniformity standards indicated in TG/1/3 and TG/186/1 of UPOV publication standard.

Off-type plants will be detected and the characters in which they differ from the normal plants will be recorded. In general, the assessment of differences between variant plants and majority plants will be based on the level of differences required to differentiate between varieties.

When confirmation of the characters of suspected off-types is required, off-type plants and majority plants will be grown in the following season.

3. Stability

No specific test will be carried out but stability may be inferred from the plots by noting variation and segregation within the plots grown from the collected or submitted sample.

B. Year 2

Laboratory and field observation will be carried out as in year 1.

1. Distinctness

Data obtained from first year obsevations will be compared with the data of 2nd year plots of the same variety under similar agronomic condition. In addition, descriptive records will be prepared to supplement the 1st year's provisional report.

2. Uniformity

The observations made in the 2nd year will be used to confirm the provisional report prepared in the first year.

3. Stability

In field condition it should be observed.

IV. VISIT TO TEST CENTER

The breeders/applicants are encouraged to visit the test center to view their material and discuss with SCA personnel. DUS-test personnel of SCA can also visit the breeder's trial plots, if necessary.

V. REPORTING PROCEDURE

A. At the following stages a written summary of the data will be informed by the SCA to the breeders/applicatns.

a) If the tests show any marked lack of purity and uniformity

b) If the distinctness of a variety is difficult to establish.

B. Reports

1 Progress report

After each growing season SCA will prepare results report of 1st year trial. If the distinctness of a variety is difficult to establish, SCA personnel may discuss with the breeder.

2. Final report

This report will be prepared following the second test season. It will include collected results, a description of the variety and if appropriate, a conclusion on how to distinguish this variety from other varieties.

C. Standards

1. Distinctness

To be judged as distinct, a variety must be seen to be clearly distinguishable, consistent and repeateble from any comparable variety in at least one character.

2. Uniformity

In the assessment of uniformity, variations observed in plots grown from submitted/collected sample must normally be of demonstrable and repeatable order. Variation which is thought or prone to be due to environmental effects is disregarded. In general, varieties must not exceed the tolerated maximum variant plant number mentioned in the TG/1/3 and TG/186/1 of UPOV guidelines.

3. Stability

Plots exceeding the fixed tolerated variant plants are considered to indicate a lack of stability, which means, excessive lack of uniformity may imply lack of stability.

D. Characteristics

Characteristics for DUS test of sugarcane in Bangladesh are selected comparing the characteristics of UPOV and India, and given in the Table of characteristics.

1. 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.

(+) It is to be noted that for certain characteristics the plant parts on which observation to be taken are given in the explanation or figure(s) for clarity and not for the colour variation.

Isd : Ishurdi
BSRI : Bangladesh Sugarcrop Research Institute
RHS : Royal Horticulture Society Colour Chart
End of grand growth stage: 210-240 days
Maturity stage: 270-300 days
Harvest stage: 300-360 days.

Table 13: Charcters for DUS yest of Sugarcane

Sl. No.	Characteristics	Statges	Note	Example varieties	Stage of observation (days)
1. (*) (+)	Plant: Growth habit	Erect Semi-erect	1 2	Isd 40 Isd 25	210-240
2. (*) (+)	Plant: Adherence of leaf sheath	weak (self de-trashing) Medium (semi clasping) Strong (tight clasping)	3 5 7	Isd 30 Isd 35 Isd 28	270-300
3. (+)	Plant: Number of millable canes (NMC) per stool	Low (<3.0) Medium (3.0-5.0) High (5.1-7.0) Very high (>7.0)	3 5 7 9	 Isd 25 Isd 37	300-360
4.	Plant: Leaf carriage	Open Compact	1 2	Isd 35 Isd 37	210-240
5.	Plant: Intensity of green colour of leaf canopy	Light Medium Dark	3 5 7	Isd 2-54 Isd 16 Isd 25	210-240
6. (+)	Plant: Cane height (from the base to the TVD leaf)	Short (<1.75 m) Medium (1.75-3.0m) Tall (>3.0 m m)	3 5 7	 Isd 24 BSRI Akh 42	300-360
7. (*) (+)	Internode: Diameter	Thin (<2.2 cm) Medium (2.2-3.0 cm) Thick (>3.0 cm)	3 5 7	 Isd 35 BSRI Akh 41	270-300
8. (*) (+)	Internode: Shape	Cylindriacal Tumescent Bobbin shaped Conoidal Obconoidal Curved	1 2 3 4 5 6	Isd 37 BSRI Akh 42 ISd 39 ISd 38	270-300
9.	Internode: Cross-section	Round Oval	1 2	Isd 39	300-360
10. (*) (+)	Internode: Colour (Exposed to sun)	Green yellow group (RHS 1) Yellow green group (RHS 144-154) Yellow group (RHS 3-13, 22) Greyed group (RHS 160-182, 184, 199) Brown group (RHS 200) Purple group (RHS 59-65, 77)	1 2 3 4 5 6		270-300
11. (*) (+)	Internode: Colour (Not Exposed to sun)	Green (RHS 138-143) Green yellow (RHS 1) Green White (RHS 157) Yellow (RHS 2-11) Yellow Green (RHS 145-154) Yellow white (RHS 158) Orange white (RHS 159) Greyed green (RHS 193) Greyed yellow (RHS 160)	1 2 3 4 5 6 7 8 9		270-300
12.	Internode: Split/growth crack	Absent Present	1 9	Isd 39 Isd 25	270-300

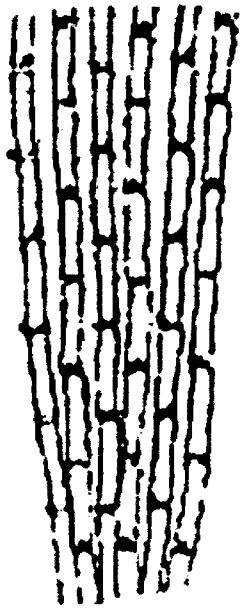
Sl. No.	Characteristics	States	Note	Example varieties	Stage of observation (days)
13.	Internode: Alignment	Straight Zigzag	1 9	Isd 37	270-300
14. (*) (+)	Internode: Appearance (rind surface)	Smooth Corky patches only Ivory marks only Corky patches and ivory marks present	1 2 3 4	Isd 16 BSRI Akh 41	270-300
15.	Internode: Pithiness	Absnt Present	1 9	Isd 39 Isd 35	300-360
16. (*)	Internode: Waxiness	Absnt Light Medium Heavy	1 3 5 7	BSRI Akh 42 Isd 27 Isd 30 Isd 40	270-300
17.	Node: Width of root band	Narrow (< 6mm) Medium (6-8 mm) Broad (>8mm)	3 5 7	Isd 24 Isd 40 Isd 39	270-300
18. (+)	Node: Bud shape	Triangular-pointed Oval Obovate, Pentagonal, Rhomboid, Round Ovate Rectangular Beaked	1 2 3 4 5 6 7 8 9	Isd 20 Isd 24 Isd 33 Isd 38 Isd 16	270-300
19.	Node: Bud prominence	Flat Bulging	1 9	Isd 19 Isd 40	270-300
20. (*)	Node: Depth of bud groove	Absent Shallow Medium Deep	1 3 4 5	Isd 40 Isd 34 Isd 16	270-300
21.	Node: Size of bud (Measured from base of bud to the tip)	Small (6 mm or less), Medium (7-9 mm), Large (10 mm or more)	3 5 7	Isd 19 Isd 24 BSRI Akh 41	270-300
22.	Node: Bud tip position in relation to growth ring	Clearly below growth ring Touching the ring Clearly above growth ring	3 5 7	Isd 19 Isd 33 Isd 26	270-300
23.	Node: Pubescence on the bud	Absent Present	1 9		270-300
24. (*)	Node: Bud cushion (Space between bud (base and leaf scar)	Absent Present	1 9	Isd 38 Isd 19	270-300
25. (+)	Node: Growth ring appearance	Weak (Not swollen) Strong (Swollen)	1 9	Isd 39 Isd 33	270-300
26.	Node: Root primordial arrangement	One row Two rows Three rows Four rows Irregular	1 2 3 4 5	 Isd 34 Isd 17 Isd 39	270-300

Sl. No.	Characteristics	States	Note	Example varieties	Stage of observation (days)
27. (*)	Leaf sheath: Number of hairs (Groups 57)	Absent Few Many	1 3 5	Isd 34 Isd 16 Isd 24	210-240
28.	Leaf sheath: Distribution of hairs	Absent Only dorsal Lateral and dorsal	1 3 5	Isd 39 Isd 33 Isd 24	210-240
29. (+)	Leaf sheath: Shape of ligule	Strap-shaped Deltoid Crescent-shaped Bow-shaped	1 2 3 4	Isd 27 Isd 39 Isd 2-54	210-240
30. (+)	Leaf sheath: Shape of inner auricle	Sloping transitional Straight transitional Ascending transitional Deltoid Dentoid Unciform Calcareform Lanceolate Falcate	1 2 3 4 5 6 7 8 9	Isd 25 Isd 19 Isd 33 Isd 17 Isd 34 Isd 30	210-240
31. (+)	Leaf sheath: Shape of outer auricle	Sloping transitional Straight transitional Ascending transitional Deltoid Dentoid Unciform Calcareform Lanceolate Falcate	1 2 3 4 5 6 7 8 9	Isd 25 Isd 33 Isd 20 Isd 34 Isd 30	210-240
32. (*)	Leaf sheath: Colour of dewlap	Greenish-yellow Yellow Yellowish-green Brown Purple	1 2 3 4 5	Isd 39	210-240
33. (*)	Leaf blade: Curvature	Erect to tip Curved near tip Bent near tip Curved near middle	1 2 3 4	Isd 18 Isd 25 Isd 17 Isd 28	210-240
34. (*)	Leaf blade: width at the longitudinal midpoint	Narrow (<3.0 cm) Medium (3.0-5.0 cm) Broad (> 5.0 cm)	3 5 7	Isd 28 Isd 34 Isd 25	210-240
35.	Leaf blade: Serration of margin	Absent Present	1 9	Isd 30 Isd 18	210-240
36.	Cane top: Waxiness	Absent Weak Medium Strong	1 3 4 5	Isd 40 Isd 38 Isd 34	210-240
37.	Special feature : (if any)				

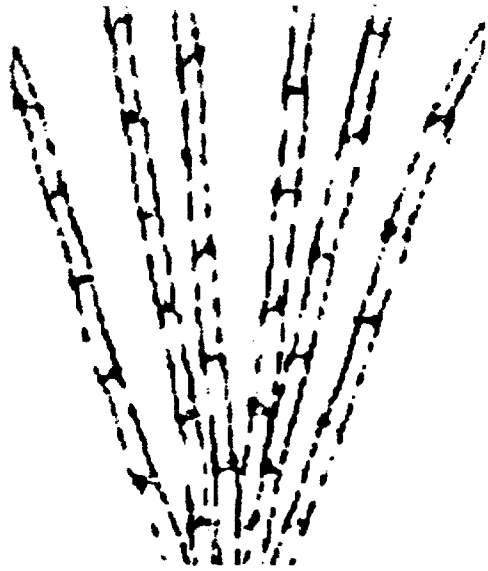
VI. EXPLANATION ON THE TABLE OF CHARACTERISTICS

Characteristic 1. Plant: Growth habit

Observations made visually on a group of plants (stools) between ground level and 60 cm height inside the plot.



1
Erect



2
Semi-erect

Characteristic 2. Plant: Adherence of leaf sheath

Observations shall be recorded by pulling dry leaves and shall be grouped as weak/free, if leaf sheath is removed completely and very easily, medium/intermediate, if small part of the leaf sheath remains attached with stem and strong/clinging, if leaf sheath is strongly and completely attached with stem.

Characteristic 3. Plant: Number of millable canes (NMC) per stool

Fully developed cane with a minimum height of one meter shall be considered as millable cane.

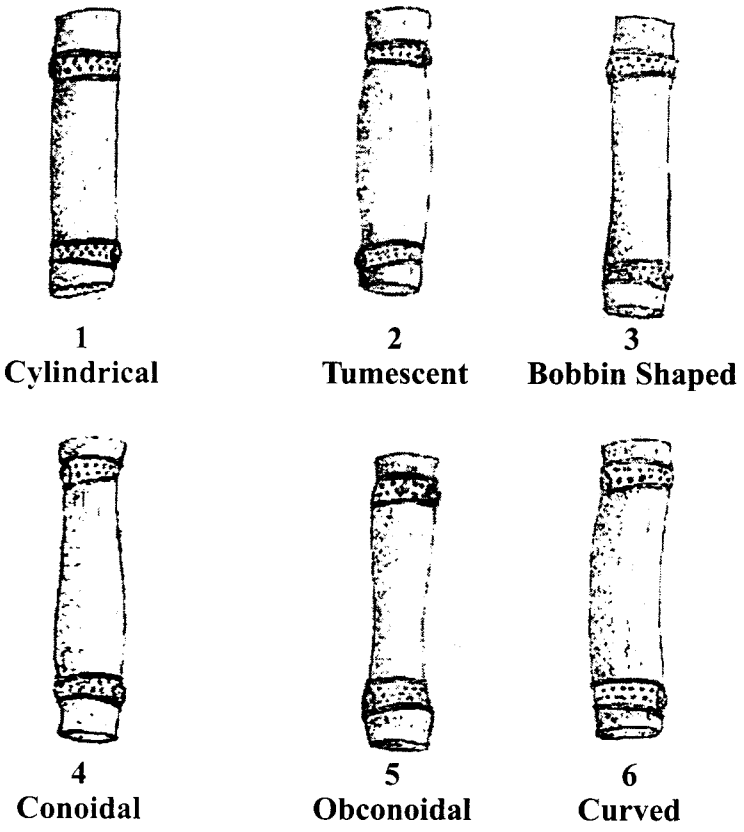
Characteristic 6. Plant: Cane height

Measurement shall be recorded from the base to the top visible dewlap (TVD).

Characteristic 7. Internode: Diameter

Diameter shall be recorded in centimeter with vernier calipers. The measurement shall be taken at the middle of cane and at the middle of the internode on the axis passing through the bud.

Characteristic 8. Internode: Shape



1 Cylindrical | 2 Tumescent | 3 Bobbin Shaped

4 Conoidal | 5 Obconoidal | 6 Curved

Characteristic 10. Internode: Colour exposed to sun

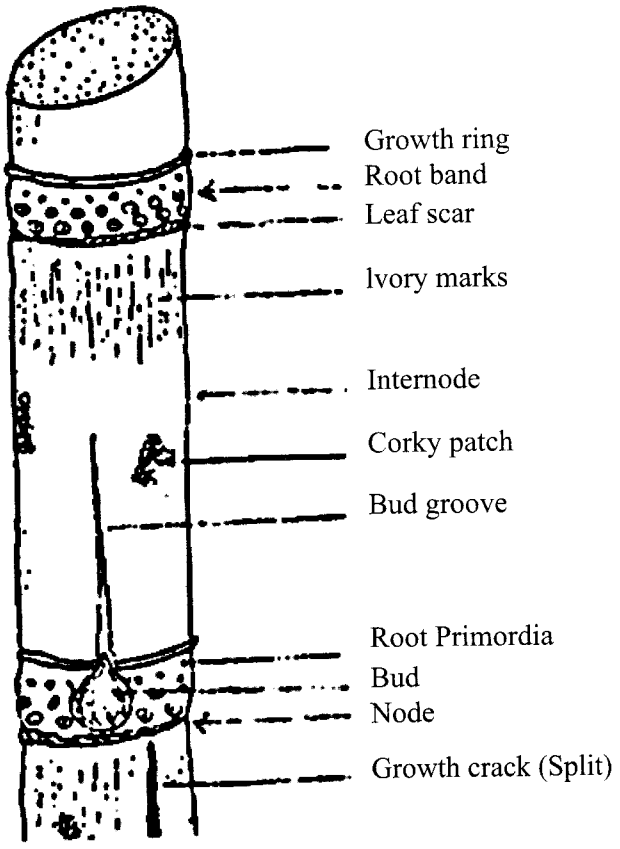
Colour of the stem shall be recorded at fifth internode from the base, two months after de-trashing and removing the wax with moist cotton.

Characteristic 11. Internode: Colour not exposed to sun

Unexposed colour shall be recorded by removing two lower most green leaves of the stem (after removing the wax with moist cotton) in the middle of the plot.

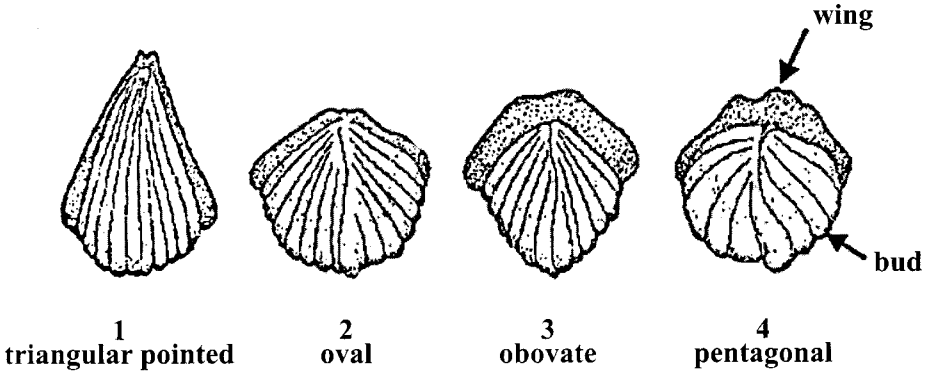
Characteristic 14. Internode: appearance (rind surface)

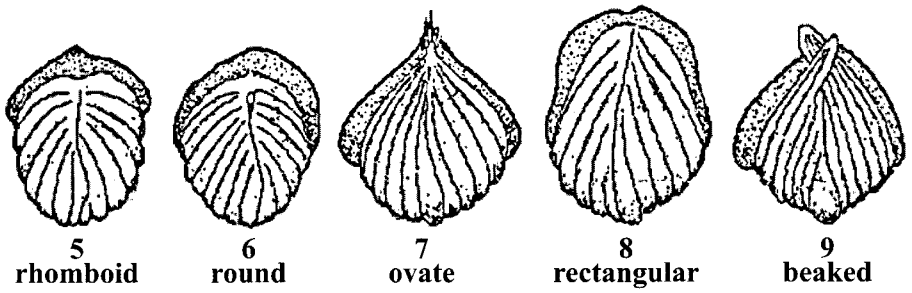
Corky patches (also known as weather marks) are irregular shaped grey or brown patches on the epidermis. Ivory marks are shallow crevices on the rind below nodes appearing as short or long thin lines. Also known as corky cracks, imparts rough texture to the rind.



Characteristic 18. Node: Bud shape

This character shall be observed on the bud at top most joint whose leaf had fully dried.

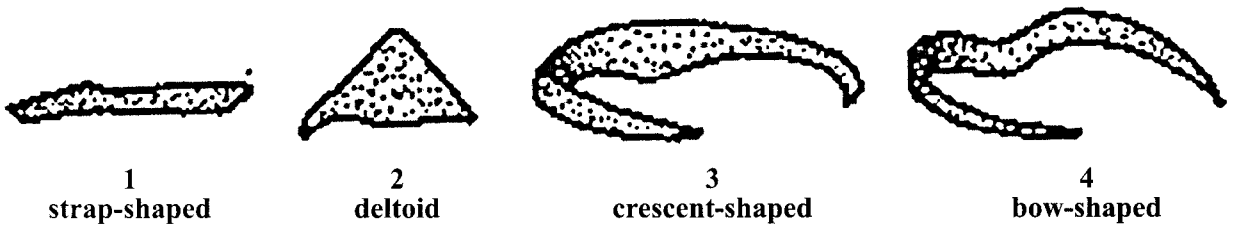




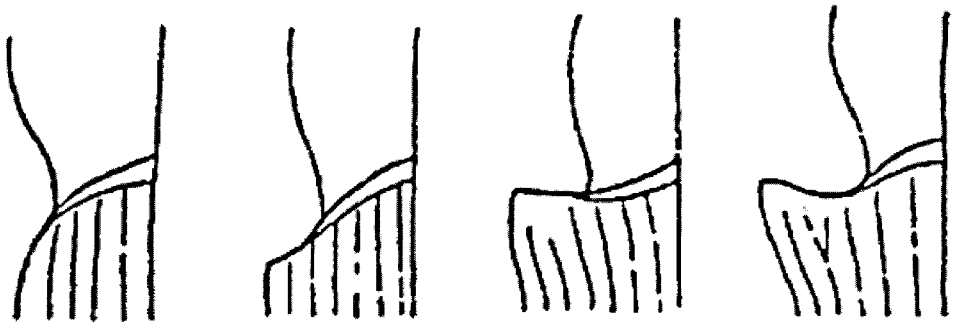
Characteristic 25. Node: Growth ring appearance

This is a region just above the root zone and shall be observed at a location opposite to the bud in the middle of cane.

Characteristic 29. Leaf sheath: Shape of ligule



Characteristic 30, 31. Leaf sheath: Shape of inner auricle and outer auricle

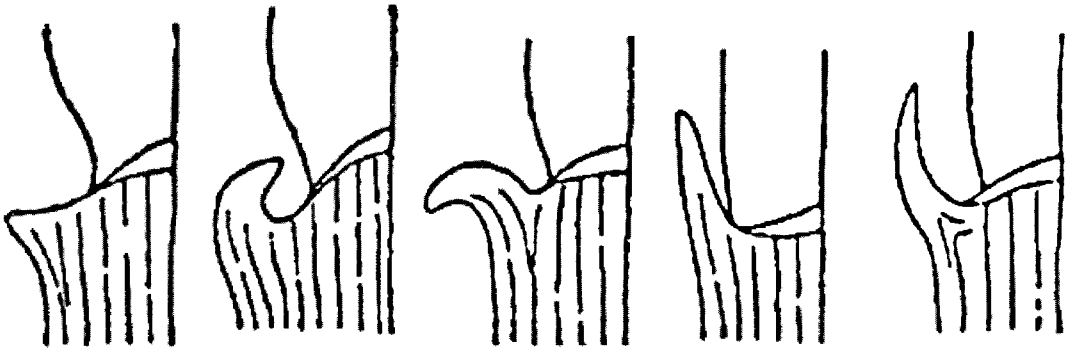


1
Sloping transitional

2
Straight transitional

3
Ascending transitional

4
Deltoid



5
Dentoid

6
Unciform

7
Clacareform

8
Lanceolate

9
Falcate

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বাংলাদেশ গেজেট

কর্তৃপক্ষ কর্তৃক প্রকাশিত

বুধবার, ডিসেম্বর ১১, ২০১৯

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

বীজ অনুবিভাগ, কৃষি মন্ত্রণালয়

প্রজ্ঞাপন

তারিখ : ২০ অগ্রহায়ণ ১৪২৬/০৫ ডিসেম্বর ২০১৯

নং ১২.০০.০০০০.০৯৭.০২.০০৩.১৯.১২০৩ - ১৯- সেপ্টেম্বর-২০১৯ খ্রিঃ তারিখে অনুষ্ঠিত জাতীয় বীজ বোর্ডের ১০০তম সভায় সিদ্ধান্ত অনুযায়ী সরকার হাইব্রিড ধানের জাত মূল্যায়ন ও নিবন্ধীকরণ পদ্ধতি অনুমোদিত হয়েছে। এ পরিপ্রেক্ষিতে এতদসংক্রান্ত পূর্ববর্তী প্রজ্ঞাপন বাতিলপূর্বক হাইব্রিড ধানের জাত মূল্যায়ন ও নিবন্ধীকরণের লক্ষ্যে নিম্নবর্ণিত পদ্ধতি সংশ্লিষ্ট সকলের অবগতি ও অনুসরণের জন্য জারি করা হলো।

হাইব্রিড ধানের জাত মূল্যায়ন ও নিবন্ধন নির্দেশিকা

দেশে গবেষণার মাধ্যমে উদ্ভাবিত এবং আমদানিকৃত হাইব্রিড ধানের জাত মূল্যায়নের জন্য জাতীয় বীজ বোর্ডে নিবন্ধিকরণ ও ছাড়করণের উদ্দেশ্যে 'হাইব্রিড ধানের জাত মূল্যায়ন ও নিবন্ধন নির্দেশিকা'টি প্রণয়ন করা হইল। 'বীজ আইন, ২০১৮' বা জাতীয় বীজ বোর্ডের সিদ্ধান্তের পরিপন্থি না হইলে হাইব্রিড ধানের জাত মূল্যায়ন ও নিবন্ধনের জন্য নিম্নোক্ত পদ্ধতি অনুসরণ করিতে হইবেঃ

১। নিবন্ধনের জন্য প্রস্তাবকারী প্রতিষ্ঠানের যোগ্যতা।

১। হাইব্রিড ধানের বীজ উৎপাদনের জন্য কৃষিবিদসহ প্রয়োজনীয় কারিগরি জনবল থাকিতে হইবে।

২। বীজ প্রক্রিয়াজাতকরণ, গুদামজাতকরণ এবং ডিহিউমিডিফিইড সংরক্ষণ সুবিধা থাকিতে হইবে।

৩। নিবন্ধনের আবেদনের পূর্বে সংশ্লিষ্ট প্রতিষ্ঠানকে কমপক্ষে একবার নিজস্ব তত্ত্বাবধানে প্রস্তাবিত হাইব্রিড জাতের মাঠ মূল্যায়ন করিতে হইবে এবং ট্রায়াল স্থাপনের তথ্য সংশ্লিষ্ট জেলা বীজ প্রত্যয়ন অফিসারকে অবহিত করিতে হইবে।

১। নিবন্ধনের আবেদন।

১। হাইব্রিড ধানের জাত নিবন্ধনের জন্য প্রস্তাবকারী প্রতিষ্ঠানকে নির্ধারিত ফরমে (পরিশিষ্ট 'ক' দ্রষ্টব্য) সদস্য সচিব, কারিগরি কমিটি ও পরিচালক, বীজ প্রত্যয়ন এজেন্সি বরাবর আবেদন করিতে হইবে;

২। আবেদন ফরমের সহিত জাত মূল্যায়নের জন্য প্রস্তাবিত জাতের কমপক্ষে ০৮ (আট) কেজি নমুনা বীজসহ ট্রায়াল স্থাপনের খরচ বোরো মৌসুমে ১৫ ফেব্রুয়ারী ও আমন মৌসুমে ১৫ মে. এর মধ্যে (প্রযোজ্য ক্ষেত্রে) পরিচালক, বীজ প্রত্যয়ন এজেন্সির নিকট পৌছাইতে হইবে।

৩। নমুনা বীজের সহিত অন্য ফসল বা জাতের বীজ কিংবা অন্য কোনো শনাক্তকারী চিহ্ন ব্যবহার করিলে নমুনা বাতিল বলিয়া গণ্য হইবে। আবেদনকারীর প্রস্তাব বীজ প্রত্যয়ন এজেন্সি যাচাই বাছাই করিয়া প্রস্তাব গ্রহণ এবং বাতিলের সিদ্ধান্ত প্রস্তাবকারীকে জানাইতে হইবে।

৪। প্রতিটি হাইব্রিড জাত মূল্যায়ন ও নিবন্ধনের জন্য আবেদনকারীকে ৩,০০০/- (তিন হাজার) টাকা সরকারি কোষাগারে কোড নং- ১-৪৩৩৮-০০০০-২০১৭ এ জমা প্রদানপূর্বক চালানের মূলকপি আবেদনের সহিত দাখিল করিতে হইবে।

৫। আবেদনকারী আবেদনপত্রের সহিত প্রস্তাবিত হাইব্রিড ধানের জাতের মলিকুলার ডাটা (SSR Markers/গ্রহণযোগ্য Markers এর মাধ্যমে) পরিচালক, বীজ প্রত্যয়ন এজেন্সি এর দপ্তরে সরবরাহ করিবে। বীজ প্রত্যয়ন এজেন্সি প্রয়োজনে বাংলাদেশ ধান গবেষণা ইনস্টিটিউটের সহায়তায় উক্ত মলিকুলার ডাটা যাচাই করিবে।৬। জাত মূল্যায়নের জন্য প্রতি জাতের সর্বাধিক ২০ কেজি হাইব্রিড ধান বীজ 'উদ্ভিদ সংগনিরোধ আইন, ২০১১' অনুযায়ী আমদানি করিতে পারিবে এবং আমদানিকৃত বীজের তথ্য বীজ প্রত্যয়ন এজেন্সিকে লিখিতভাবে অবহিত করিতে হইবে।

৭। প্রতি মৌসুমে প্রস্তাবকারী প্রতিষ্ঠান অনধিক ২টি জাত মূল্যায়নের জন্য প্রস্তাব করিতে পারিবে।

৩। ট্রায়াল বাস্তবায়ন

১। বীজ প্রত্যয়ন এজেন্সি'র তত্ত্বাবধানে ফসলের জাত ও পরিবেশ বিবেচনায় রেখে প্রস্তাবিত হাইব্রিড ধানের জাত পরপর দুই বছর অনস্টেশন ও অনফার্ম ট্রায়াল বাস্তবায়ন করিতে হইবে;

২। বীজ প্রত্যয়ন এজেন্সি অনস্টেশন ট্রায়ালের জন্য বাংলাদেশ কৃষি উন্নয়ন কর্পোরেশন ও গবেষণা প্রতিষ্ঠানসমূহের নির্দিষ্ট খামার ব্যবহার করিবে এবং অনফার্ম ট্রায়ালের জন্য কৃষি সম্প্রসারণ অধিদপ্তরের সহযোগিতায় নিকটবর্তী এলাকার প্রগতিশীল কৃষকের মাঠ ব্যবহার করিবে;

অন-স্টেশন ও অন-ফার্ম এর ট্রায়াল স্থান নিম্নরূপঃ

অঞ্চল	প্রতিষ্ঠানিক খামার	কৃষক পর্যায়ে
১	২	৩
(১) ঢাকা অঞ্চল	বাংলাদেশ ধান গবেষণা ইনস্টিটিউট (ব্রি),গাজীপুর/ বাংলাদেশ কৃষি গবেষণা ইনষ্টিটিউট (বারি), গাজীপুর।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ
(২) ময়মনসিংহ অঞ্চল	বাংলাদেশ পরমাণু কৃষি গবেষণা ইনস্টিটিউট ময়মনসিংহ/ আঞ্চলিক কৃষি গবেষণা কেন্দ্র, বারি, জামালপুর।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ
(৩) কুমিল্লা অঞ্চল	আঞ্চলিক কেন্দ্র, ব্রি, কুমিল্লা/ কৃষি গবেষণা উপ-কেন্দ্র, বারি, কুমিল্লা।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ
(৪) চট্টগ্রাম অঞ্চল	আঞ্চলিক কেন্দ্র, ব্রি, সোনাগাজী/ বাংলাদেশ কৃষি উন্নয়ন কর্পোরেশন, ফেনী/ আঞ্চলিক কৃষি গবেষণা কেন্দ্র, বারি, হাটহাজারী, চট্টগ্রাম।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ
(৫) রাঙ্গামাটি অঞ্চল	কৃষি গবেষণা উপ-কেন্দ্র, বারি, রাইখালী, রাঙ্গামাটি।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ
(৬) বরিশাল অঞ্চল	আঞ্চলিক কেন্দ্র, ব্রি, বরিশাল/ আঞ্চলিক কেন্দ্র, বারি, রহমতপুর, বরিশাল/ কৃষি প্রশিক্ষণ ইনস্টিটিউট (ATI), বরিশাল/ লাকুটিয়া ফার্ম, বিএডিসি, বরিশাল।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ
(৭) যশোর অঞ্চল	বাংলাদেশ কৃষি উন্নয়ন কর্পোরেশন খামার, দত্তনগর/ আঞ্চলিক কৃষি গবেষণা কেন্দ্র, বারি, যশোর।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ
(৮) রাজশাহী অঞ্চল	আঞ্চলিক কেন্দ্র, ব্রি, রাজশাহী/ আঞ্চলিক গম গবেষণা কেন্দ্র, বারি, রাজশাহী।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ
(৯) রংপুর অঞ্চল	আঞ্চলিক কেন্দ্র, ব্রি, রংপুর/ কৃষি গবেষণা উপ-কেন্দ্র, বারি, রংপুর/ পাট গবেষণা আঞ্চলিক কেন্দ্র, রংপুর।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ
(১০) সিলেট অঞ্চল	আঞ্চলিক কৃষি গবেষণা কেন্দ্র, বারি, আকবরপুর, মৌলভীবাজার/ আঞ্চলিক কেন্দ্র, ব্রি, হবিগঞ্জ/ বীজ উৎপাদন খামার, বিএডিসি, খাদিমনগর, সিলেট।	সংশ্লিষ্ট অন-স্টেশনের নিকটবর্তী কৃষকের মাঠ

৬। প্রতিটি মৌসুমে প্রস্তাবিত জাতের নূন্যতম (৬টি অঞ্চল×৩টি প্লট) = ১৮টি করে অনস্টেশন ও ১৮টি করে অনফার্ম ট্রায়াল প্লট এবং সর্বাধিক (১০টি অঞ্চল ×৩টি প্লট) = ৩০টি করে অনস্টেশন ও ৩০ টি করে অনফার্ম ট্রায়াল প্লটের অনুরূপ সংখ্যক প্লটে চেকজাতের ট্রায়াল স্থাপন করিতে হইবে।

৭। ট্রায়ালের জন্য নমুনা বীজের প্যাকেটে কোড নম্বর দিয়ে পরিচালক, বীজ প্রত্যয়ন এজেন্সি সংশ্লিষ্ট স্থানে ট্রায়াল স্থাপনের জন্য প্রেরণ করিবে।

৮। প্রস্তাবিত জাতের প্লটে ব্যবহৃত সার, সেচ ও অন্যান্য আন্তপরিচর্যার অনুরূপ চেক জাতের প্লটে ব্যবহার করিতে হইবে।

৯। বর্তমান সময়ে সর্বাধিক ফলনশীল বোরো মৌসুমে ব্রি হাইব্রিড ধান-৫, আমন মৌসুমে ব্রি হাইব্রিড ধান-৬ এবং আউশ মৌসুমে কোনো হাইব্রিড ধানের জাত না থাকায় সমজীবনকাল সম্পন্ন ব্রি কর্তৃক অবমুক্ত সর্বোচ্চ ফলনসম্পন্ন ইনব্রিডের একটি জাত চেক জাত হিসেবে ব্যবহার করিতে হইবে। তবে পরবর্তী সময়ে সরকারি গবেষণা প্রতিষ্ঠান কর্তৃক সর্বশেষ উদ্ভাবিত সর্বাধিক ফলনশীল হাইব্রিড ধানের জাত চেক জাত হিসেবে ব্যবহার করিতে হইবে।

৪। ফলাফল বিশ্লেষণ, মূল্যায়ন ও উপস্থাপন।

১। কারিগরি কমিটির গঠিত 'আঞ্চলিক মাঠ মূল্যায়ন দল' প্রতিটি অঞ্চলের ছক মোতাবেক **(পরিশিষ্ট 'খ')** ট্রায়াল প্লটের তথ্য সংগ্রহ ও মূল্যায়ন করিবে। তথ্য সংগ্রহ ও মূল্যায়নের সময় প্রস্তাবকারী প্রতিষ্ঠানের একজন উপযুক্ত প্রতিনিধি আমন্ত্রিত সদস্য হিসেবে অন্তর্ভুক্ত থাকিবেন;

২। মাঠ মূল্যায়নের সময় 'আঞ্চলিক মাঠ মূল্যায়ন দল' প্রস্তাবিত জাতের বৈশিষ্ট্য লিপিবদ্ধ করিবে এবং ছক অনুযায়ী **(পরিশিষ্ট 'খ')** প্রতিটি অনস্টেশন ও অনফার্ম এর তথ্য সংগ্রহ করে দলের সকলের মতামতসহ পরিচালক, বীজ প্রত্যয়ন এজেন্সির নিকট পাঠাইতে হইবে।

৩। সংগৃহীত তথ্য হইতে পরিচালক, বীজ প্রত্যয়ন এজেন্সি একটি Computerized mean performance sheet তৈরী করিবে এবং ফলাফল নির্দিষ্ট চেক জাতের সহিত তুলনা করিবে।

৪। ট্রায়াল শেষ হওয়ার দুই মাসের মধ্যে বিশ্লেষিত তথ্য ও আঞ্চলিক মাঠ মূল্যায়ন দলের মতামতসহ প্রতিবেদন বীজ প্রত্যয়ন এজেন্সি, কারিগরি কমিটির সভায় উপস্থাপন করিবে। উক্ত প্রতিবেদন বোরো, আউশ ও আমন মৌসুমের জন্য যথাক্রমে ২০ আগষ্ট, ২০ নভেম্বর এবং ২০ মার্চের মধ্যে কারিগরি কমিটির সভায় উপস্থাপন করিতে হইবে।

৫। মাঠ মূল্যায়নের পাশাপাশি পরীক্ষাগারে হাইব্রিড জাতের পোকামাকড় ও রোগবালাইয়ের প্রতি আক্রান্ত হওয়ার প্রবণতা নিরুপন করা হইবে। রোগবালাই ও পোকামাকড়ের আক্রান্ত হওয়ার প্রবণতা নিরূপণের জন্য বীজ প্রত্যয়ন এজেন্সি প্রয়োজনীয় পরিমাণ বীজ বাংলাদেশ ধান গবেষণা ইনস্টিটিউটকে সরবরাহ করিবে। ব্রি, প্রস্তাবিত জাতের রোগবালাই ও পোকামাকড়ের আক্রান্ত হইবার প্রবণতা নিরূপনপূর্বক সুস্পট ফলাফল কারিগরি কমিটির সভায় উপস্থাপনের জন্য বীজ প্রত্যয়ন এজেন্সিতে প্রেরণ করিবে।

৬। কারিগরি কমিটি কর্তৃক প্রস্তাবিত জাতের ফলন চেক জাত হতে অনস্টেশন ও অনফার্ম উভয় ট্রায়ালে আলাদা আলাদাভাবে কমপক্ষে ৫% বেশি হইবে হইবে। তবে স্বল্প জীবনকাল ও অন্যকোনো বিশেষ বৈশিষ্ট্যের কারণে কোনো হাইব্রিড জাতকে কারিগরি কমিটি নিবন্ধনের জন্য জাতীয় বীজ বোর্ডের নিকট সুপারিশ করিতে পারিবে।

পরিশিষ্ট-ক

হাইব্রিড ধানের জাত নিবন্ধনের আবেদন ফরম

ক। প্রস্তাবকারী প্রতিষ্ঠানের নাম.....

খ। বীজ ডিলার নিবন্ধন নম্বর.....তারিখ.....

গ। প্রস্তাবিত হাইব্রিড জাতের নাম/নং.....

ঘ। প্রস্তাবিত হাইব্রিড জাত সংক্রান্ত তথ্যাদি ঃ

১) ফলন (হেক্টর প্রতি).....

২) রোগ বালাই এর প্রতিক্রিয়া.....

৩) গাছে ফুল আসার জন্য photo period requiremen.....

৪) যে তাপমাত্রায় গাছে ফুল আসে.....

৫) প্রস্তাবিত জাতের জীবনকাল (বীজ থেকে বীজ).....

৬) জাত শনাক্তকারী সুনির্দিষ্ট বৈশিষ্ট্য (একাধিক হতে পারে).....

(প্রযোজ্য ক্ষেত্রে দাবীর সপক্ষে প্রমাণপত্র দাখিল করতে হবে)

৭) অ্যামাইলোজ (Amylose) এর পরিমাণ (%).....

ঙ। সরবরাহকারী/জাত উদ্ভাবনকারী প্রতিষ্ঠানের নাম ও ঠিকানা.....

চ। সরবরাহকারী/জাত উদ্ভাবনকারী প্রতিষ্ঠানের সাথে আমদানিকারকের সমঝোতা পত্রের প্রতিলিপি.....

ছ। কোন মৌসুমের জন্য হাইব্রিড জাতের ধান মূল্যায়নের প্রস্তাব করা হচ্ছে.....

জ। মোট টেস্ট প্লটসমূহের জন্য বীজ সরবরাহ ও নির্ধারিত অংকের অর্থ প্রদানের অংগীকারনামা (আলাদা সীটে দিতে হবে)

ঝ। সংশ্লিষ্ট কোম্পানি/প্রতিষ্ঠানের নিজস্ব ট্রায়ালে প্রাপ্ত ফলাফল (এক বছরের) ঃ

১) ফলন (হেক্টর প্রতি চাউলে).....

২) পোকামাকড় ও রোগ বালাইয়ের অবস্থা (Status).....

৩) গাছে ফুল আসার জন্য photo period requirementঃ.....

৪) যে তাপমাত্রায় গাছে ফুল আসে.....

৫) প্রস্তাবিত জাতের জীবনকাল (বীজ থেকে বীজ).....

৬) জাত শনাক্তকারী সুনির্দিষ্ট বৈশিষ্ট্য (একাধিক হতে পারে).....

(প্রযোজ্য ক্ষেত্রে দাবীর সপক্ষে প্রমাণপত্র দাখিল করতে হবে)

ঞ। প্রস্তাবিত জাতের Phytosanitary Certificate এর নম্বর/বিবরণী এবং কৃষি সম্প্রসারণ অধিদপ্তরের উদ্ভিদ সংগনিরোধ ছাড়পত্র-IP ও RO (প্রযোজ্য ক্ষেত্রে অনুলিপি দিতে হবে)।

প্রস্তাবকারী ব্যক্তি/প্রতিষ্ঠানের দায়িত্বপ্রাপ্ত কর্মকর্তার
স্বাক্ষর ও তারিখ

পরিশিষ্ট-খ

হাইব্রিড ধানের জাত মাঠ মূল্যায়ন ছক

জাতের কোড নম্বর	বপনের তারিখ	রোপনের তারিখ	৫০ ভাগ হেডিং এর তারিখ	পরিপক্কতার তারিখ	বীজ থেকে বীজের পরিপক্কতার সময় (দিন)	বন্ধ্যতার শতকার হার	প্রধান রোগ সমূহ ০-৯ মানদন্ডে	প্রধান পোকামাকড় সমূহ ০-৯ মানদন্ডে	ফিনোটাইপিক গ্রহনযোগ্যতা ০-৯ মানদন্ডে	ঝড়েপড়া ০-৯ মানদন্ডে	ফলন কেজি/হে. (১৪% আদ্রতায়)				নিবন্ধনের সুপারিশ	মন্তব্য
											R_1	R_2	R_3	গড় ফলন		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

তথ্য সংগ্রহকারীগণের নাম, পদবী ও স্বাক্ষর

মূল্যায়নের দলের সদস্যবৃন্দের
নাম, পদবী ও স্বাক্ষর

ফুল ফোটার তারিখ:

কর্তনের তারিখ

দলনেতার স্বাক্ষর ও তারিখ
পদবী/প্রতিষ্ঠান

APPENDIX-I

I(a): FORM OF PRE-POST CONTROL AND GROW-OUT TEST FOR RICE

Plot No	Variety	Source of Seed	Lot No	Class of Seed	Total Other var./ off types	Characterwise other Varieties/off types							Re-marks
						Culm length	50% Heading	Lemma colour	Panicle Exertion	Distribution of awn	Grain length	Grain width	
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Date of Sowing:
Date of Transplanting:

Class of Seed	Plant population	Allowable other variety Off type	No of Variety :
BS	4000(0.0%)	0	No of Breeder Seed lot:
FS	4000(0.1%)	4	No of Foundation Seed lot:
CS/MM/ Farmer's level samples	400(0.5%)	2	No of CS/MM/Farmer's level samples

I(b): FORM OF PRE- POST CONTROL AND GROW-OUT TEST FOR WHEAT

Plot No.	Variety	Source of seed	Lot No	Class of Seed	Total Other var./ off type	Character wise other Varieties/off types							Other Crops	Re-marks
						Auricle colour	Glau cosity	50% Emerge	LGB length	Chaff colour	Culm length	Others		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Date of Sowing:
Date of Transplanting:

Class of Seed	Plant population	Allowable other variety Off type	No of Variety :
BS	4000(0.0%)	0	No of Breeder Seed lot:
FS	4000(0.1%)	4	No of Foundation Seed lot:
CS/MM/ Farmer's level samples	400(0.5%)	2	No of CS/MM/Farmer's level samples

I(c): FORM OF PRE-POST CONTROL AND GROW-OUT TEST FOR JUTE

Plot No.	Variety	Source of Seed	Lot No.	Class of Seed	Total other variety	Character wise Other Varieties							Remarks
						stipule colour	Petiole colour	leaf shape	leaf texture	Stem Colour	Days to first flowering	Flower bud pigmentation	
1	2	3	4	5	6	7	8	9	10	11	12	13	14

Date of Sowing:

Class of Seed Plant Population Allowable other Variety/Off types No. of Variety : Total-

BS No of Breeder Seed lot:

FS No of Foundation Seed lot:

CS/MM No of Certified Seed lot:

Parenthesis indicates Problematic Seed lots

I(d): FORM OF PRE-POST CONTROL AND GROW-OUT TEST FOR POTATO

Sl No	Name of Variety	Source of Seed	Lot No.	Class of Seed	No. of infected plant %								Other Var.	Remarks
					PLRV	Mosaic	Other V disease	BW	B/Soft rot	Stem rot	Root rot	EB 0-5		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Date of Sowing :
No. of Variety :
No. of Tubers :
No. of Breeder Seed Lot :
No. of Foundation Seed Lot :
No. of Certified Seed Lot. :

Parenthesis indicates Problematic Seed lost

APPENDIX-II

Seed Standard of Paddy

Factor	Standard		
	Breeder	Foundation	Certifited
1. Pure Seed (Min. % by wt.)	99.0	97.0	96.0
2. Inert Matter (Max. % by wt.)	1.0	2.0	3.0
3. Other Seed (Max. % by wt.) a) Other crop seed (Max. No. in total : whole sample will be tested) b) Total weed seed (Max. No. in total : whole sample will be tested)	Trace 2/kg 2/kg	1.0 5/kg 8/kg	1 10/kg 10/kg
4. Germination (Min. %)	80.0	80.0	80.0
5. Moisture content (Max. %)	12.0	12.0	12.0

Field Standard of Paddy.

Factor	Standard		
	Breeder	Foundation	Certifited
1. Isolation distance (in meter)	3.0	3.0	3.0
2. Other crop plants (Max. % by No.)	0.0	0.1	0.2
3. Other Varieties (Max. % by No.)	0.0	0.1	0.5
4. Weed plants (obnoxious Max. % by No.) a. Wild rice/Red rice (ঝরা ধান/বন্য ধান) b. Burnyard grass (শ্যামা)	0.0	0.01	0.02
5. Plants infected by seed borne diseases : (Max % by of infected plants)	5.0	10.0	20.0
6. General condition of crop: If the field crops severely damaged or lodged and irregularly flowered that makes crop assessment difficult to judge the trueness of variety and varietal purity, will be rejected.			

N.B. : Obnoxious weeds to be specified by competent authority.

Seed Standard of Wheat

Factor	Standard		
	Breeder	Foundation	Certifited
1. Pure Seed (Min. % by wt)	99.0	97.0	96.0
2. Inert Matter (Max. % by wt.)	1.0	2.0	3.0
3. Other Seed (Max. % by wt)	Trace	1.0	1
a) Other crop seed (Max. No. in total: whole sample will be tested)	2/kg	5/kg	10/kg
b) Total weed seed (Max. No. in total : whole sample will be tested)	2/kg	8/kg	10/kg
4. Germination (Min. %)	85.0	80.0	80.0
5. Moisture content (Max. %)	12.0	12.0	12.0

Field Standard of Wheat

Factor	Standard		
	Breeder	Foundation	Certifited
1. Isolation distance (in meter)	3.0	3.0	3.0
2. Other crop plants (Max. % by No.)	0.0	0.1	0.2
3. Other Varieties (Max. % by No.)	0.0	0.1	0.5
4. Weed plants (obnoxious Max. % by No.) a) Lehli (হিটকীরি) b) Wild oat (বন্য যই) c) Wild lentil (বন মসুর)	0.0	0.03	0.05
5. Diseases (infection by seed borne pathogen : Max. No. of infected plants) Loose smut (plants/ha)	0.0	12.0	25.0
6. General condition of crop: If the field crop so stunted, damaged or lodged that makes crop assessment difficult to judge the trueness of variety and varietal purity, will be rejected.			

N.B. : Obnoxious weeds to be specified by competent authority.

Seed Standard of Jute

Factor	Standard		
	Breeder	Foundation	Certifited
1. Pure Seed (Min. % by wt.)	99.0	98.0	96.0
2. Inert Matter (Max. % by wt.)	1.0	1.0	3.0
3. Other Seed (Max. % by wt)	Trace	1.0	1.0
a) Other crop seed (Max. No. in total : whole sample will be tested)	0/kg	5/kg	10/kg
b) Total weed seed (Max. No. in total : whole sample will be tested)	0/kg	5/kg	10/kg
4. Germination (Min. %)			
a) Fresh seed (Min. %)	80.0	80.0	80.0
b) Carry over seed (Min. %)	70.0	70.0	70.0
5. Moisture content (Max. %)			
a) *C. capsularis*	10.0	10.0	10.0
b) *C. olitorius*	8.0	8.0	8.0

Field Standard of Jute

Factor	Standard		
	Breeder	Foundation	Certifited
1. Isolation distance (in meter)			
a) Field of other varieties of the same species	50.0	30.0	20.0
b) Field of other species	5.0	3.0	3.0
2. Other Varieties (Max. % by No.)	0.0	0.1	0.2
3. Plants infected by seed brone diseases (Max. % by No.)	0.0	0.1	0.5
4. Crop condition: If crops so weedy damaged or lodged that makes inspection difficult to judge the trueness of variety and varietal purity, will be rejected			

N.B. : Obnoxious weeds to be specified by competent authority.

Seed Standard of Kenaf and Mesta.

Factor	Standard		
	Breeder	Foundation	Certifited
1. Pure Seed (Min. % by wt)	98.0	96.0	95.0
2. Inert Matter (Max. % by wt)	2.0	4.0	5.0
3. Other Seed (Max. % by wt) a) Other crop seed (Max. No. in total : whole sample will be tested) b) Total weed seed (Max. No. in total : whole sample will be tested)	2/kg 2/kg	5/kg 5/kg	10/kg 10/kg
4. Germination (Min. %)	80.0	80.0	80.0
5. Moisture content (Max. %)	10.0	10.0	10.0
6. Moisture content in vapour proof container (Max. %)	8.0	8.0	8.0

Field Standard of Kenaf and Mesta.

Factor	Standard		
	Breeder	Foundation	Certifited
1. Isolation distance (in meter)	50.00	50.00	30.00
2. Other crop plants (Max. % by No.)	0.00	0.10	0.50
3. Other Varieties (Max. % by No.)	0.00	0.10	0.50
4. Weed plants (obnoxious Max. %by No).	0.00	0.50	0.80
5. Plants infected by seed borne diseases : (Max % of infected plants)			
6. General condition of crop: if the field crop is severely damaged or lodged and irregularly flowered or otherwise damaged that makes assessment difficult will be rejected.			

N.B. : Obnoxious weeds to be specified by competent authority.

টিস্যু কালচারের মাধ্যমে উৎপাদিত বীজ আলুর মাঠমান এবং বীজমান (Field Standard and Seed Standard of Tissue Culture Seed Potato)

(ক) মাঠ মান (Field Standard)

ক্র: নং	মানদন্ড/পরিমাপক	প্লান্টলেট/মাইক্রোটিউবার	মিনিটিউবার	প্রাক-ভিত্তি বীজ	ভিত্তি বীজ	প্রত্যায়িত বীজ	মানঘোষিত বীজ
০১	জাতের বিশুদ্ধতা (%)	১০০	১০০	১০০	১০০	৯৯.৫	৯৯.৫
০২	অন্যান্য ফসল ও আগাছার সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.০০	০.০০	০.০০
০৩	আলু অন্য জাতের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.২০	০.২০	০.২০
০৪	পৃথকীকরণ দূরত্ব (মিটার)						
	ক) অবীজ আলু থেকে দূরত্ব	*	**	৩০	৩০	৩০	৩০
	খ) অন্য বেগুন গোত্রের ফসল থেকে দূরত্ব	*	**	১৫	১৫	১৫	১৫
০৫	পিএলআরভি (PLRV) আক্রান্ত গাছের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.৫০	২০.০	২.০
০৬	মোজাইক (PVY, PVA PVM, PVS, PVX) আক্রান্ত গাছের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	১.০০	৫.০০	৫.০০
০৭	নাবী ধ্বসা (Late blight) আক্রান্ত গাছের সর্বোচ্চ সংখ্যা (%)	০.০০	০.৫০	০.৫০	১.০০	৫.০০	৫.০০
০৮	ব্যাকটেরিয়াল উইল্ট বা ব্রাউন রট (Bacterial Wilt/Brown rot) আক্রান্ত গাছের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.০০	০.০০	০.০০
০৯	ব্লাক লেগ (Black leg)/ ব্লাক সফট্ রট (Soft rot) আক্রান্ত গাছের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.৫০	১.০০	১.০০

ক্র: নং	মানদন্ড/পরিমাপক	প্লান্টলেট/মাইক্রোটিউবার	মিনিটিউবার	প্রাক-ভিত্তি বীজ	ভিত্তি বীজ	প্রত্যায়িত বীজ	মানঘোষিত বীজ
১০	রিং রট (Ring rot) *** আক্রান্ত গাছের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.০০	০.০০	০.০০
১১	গোল্ডেন নেমাটোড (Golden Nematode) *** আক্রান্ত গাছের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.০০	০.০০	০.০০

বি: দ্র: এই স্ট্যান্ডার্ডটি টিস্যু কালচারের মাধ্যমে উৎপাদিত বীজ আলুর মাঠমান এবং বীজমান ক্ষেত্রে প্রযোজ্য। ২। প্লান্টলেট/মাইক্রো-টিউবার বীজের উৎস হইবে প্রজনন বীজ।

* ল্যাবরেটরিতে উৎপাদন : ** গ্রীণ হাউজ/নেট হাউজে উৎপাদন; *** রিং রট এবং গেলে নেমাটোড রোগ বাংলাদেশে এখনো পরিলক্ষিত হয়নি।

Note :
1. PLRV = Potato Leaf Roll Virus
2. PVY = Potato Virus Y
3. PVS = Potato Virus S
4. PVM = Potato Virus M
5. PVA = Potato Virus A
6. PVX = Potato Virus X
7. Late blight= *Phytophthora infestans*
8. Bacterial wilt or Brown rot = *Ralstonia solanacearum*
9. Black leg and Soft rot = *Pectobacterium atrosepticum* (older synonym : *Erwinia carotovora subsp. astroseptica*), *Pectobacterium carotovorum* and *Dickeya dadantii.*
10. Black scurf = *Rhizoctonia solani.*
11. Common scab = *Streptomyces scabies.*
12. Golden nematode = *Globodera rostochiennsis.*
13. Ring rot = *Corynebacterium sopedomicum.*

(খ) বীজ মান (**Seed Standard**)

ক্র: নং	মানদন্ড/পরিমাপক	প্লান্টলেট/মাইক্রোটিউবার	মিনিটিউবার	প্রাক-ভিত্তি বীজ	ভিত্তি বীজ	প্রত্যায়িত বীজ	মানঘোষিত বীজ
০১	অন্য জাত (Other Variety) কন্দের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.২০	০.২০	০.২০
০২	পঁচা আলু (Rotten Tuber)						
	ক) ব্যাকটেরিয়াল উইল্ট বা ব্রাউন রট (Bacterial wilt or Brown rot) আক্রান্ত কন্দের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.০০	০.০০	০.০০
	খ) অন্যান্য পঁচা আলু - নাবী ধ্বসা (Late blight), নরম পঁচা (Soft rot), শুকনা পঁচা (Dry rot), আক্রান্ত কন্দের	০.০০	০.০০	০.০০	০.১০	০.৫০	০.৫০
০৩	কমন স্ক্যাব (Common scab)- (বীজের ত্বকে ১/৮ অংশ সুপারফিসিয়াল লেশন) আক্রান্ত কন্দের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	৩.০০	৮.০০	৮.০০
০৪	ব্লাক স্কার্ফ (Black scurfy) / রাইজোকটনিয়া (Rhizoctonia) বীজের ত্বকে ১/৮ অংশ সুপারফিসিয়াল লেমন) আক্রান্ত কন্দের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	২.০০	৫.০০	৫.০০
০৫	রিং রট (Ring rot)** আক্রান্ত কন্দের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.০০	০.০০	০.০০
০৬	গোল্ডেন নেমাটোড (Golden Nematode) ** আক্রান্ত কন্দের সর্বোচ্চ সংখ্যা (%)	০.০০	০.০০	০.০০	০.০০	০.০০	০.০০

ক্র: নং	মানদন্ড/পরিমাপক	প্লান্টলেট/মাইক্রোটিউবার	মিনিটিউবার	প্রাক-ভিত্তি বীজ	ভিত্তি বীজ	প্রত্যায়িত বীজ	মানঘোষিত বীজ
০৭	**যেকোন ধরনের যান্ত্রিক ক্ষত** (Golden Nematode) **এবং সেকেন্ডারী গ্রোথ** (Secondary growth) **কন্দের সর্বোচ্চ সংখ্যা (%)**	০.০০	০.০০	০.০০	০.১০	০.৩০	০.৩০
০৮	বীজের আকার - গ্রেড এ: ২৫-৪০ মিমি ব্যাস, গ্রেড বি: ৪১-৫৫ মিমি ব্যাস -নির্ধারিত আকার বহির্ভূত বীজ শতকরা ৫ ভাগের বেশী হলে গ্রহনযোগ্য নয় -প্রকৃত আলুবীজ হতে উৎপাদিত বীজ আলু (টিউবারলেট) উল্লিখিত গ্রেডিং এর আওতাভুক্ত নয়	যে কোনো আকার	যে কোনো আকার	যে কোনো আকার	(গ্রেড-এ এবং গ্রেড-বি)	(গ্রেড-এ এবং গ্রেড-বি)	(গ্রেড-এ এবং গ্রেড-বি)

* প্লান্টলেট/মাইক্রো-টিউবার বীজের উৎস হইবে প্রজনন বীজ।

** রিং রট এবং গোল্ডেন নেমাটোড রোগ বাংলাদেশে এখনো পরিলক্ষিত হয়নি।

বি: দ্র: এই স্ট্যান্ডার্ডটি টিস্যু কালচারের মাধ্যমে উৎপাদিত বীজ আলুর বীজমান এবং মাঠমান এর ক্ষেত্রে প্রযোজ্য।

Seed Standard of Potato

Factor	Standard		
	Breeder	Foundation	Certifited
1. Potatoes with any kind of damage or secondary growth are not acceptable			
2. Mixture of other varieties (Max. %)	0.2	0.2	0.2
3. Grade of seed potato a) 28 mm- 40 mm diameter b) 41 mm- 55 mm diameter			
4. Tubers not conforming to specific size of seed shall not exceed more than 5% by number.			
5.The above mentioned grades will not be applicable for tuberlets produced from true potato seed (TPS)			

Field Standard of Potato

Factor	Standard		
	Breeder	Foundation	Certifited
1. Isolation distance (in meter) a) From non-seed potato crop b) From other solanacious crop	 30.0 15.0	 30.0 15.0	 30.0 15.0
2. Other Varieties (Max. % by No.)	0.20	0.20	0.20
3 . Other crops (Max. % by No.)	0.00	0.00	0.00
4. Obnoxiousweeds (Max. %)	0.00	0.00	0.00
5. Diseases (infection by seed borne pathogen : Max. % infected plants) a) Late blight (*Phytopthora infestans*) b) Leaf roll PLRV c) Mosaic (PMV) d) Ring rot	 0.00 0.00 0.00 0.00	 0.00 0.50 0.10 0.00	 0.00 2.00 1.00 0.00

N.B. : Obnoxious weeds to be specified by competent authority.

Field Standard of Sugarcane.

Factor	Standard		
	Breeder	Foundation	Certifited
1. Isolation distance (No of guard raws) (Max. % by No.)	2	2	2
2. Other Varieties (Max. % by No.)	0.00	0.00	0.00
3 . Other crops (Max. % by No.)	0.00	0.00	0.00
4. Obnoxious weeds (Max. %)	0.00	0.00	0.00
5. Diseases (infection by seed borne pathogen: Max. % of infected plants)			
a) Red rot (*Colletotrichum falcatum*)	0.00	0.00	0.00
b) Mosaic (SCMV) (Stool basis)	0.00	1.00	3.00
c) Wilt (*Cephalosporium sacchari*) (Stool basis)	0.00	0.10	0.50
d) Smut (*Ustilago scitaminea*) (Stool basis)	0.00	0.10	0.30
e) RSD/GSD (Coryneform Bacteria MLO) (Stool basis)	0.00	0.10	0.50
f) White leat (MLO) (Stool basis)	0.00	0.10	0.50
g) Striga (*Striga densiflora*)	0.00	0.00	0.00

N.B. : Obnoxious weeds to be specified by competent authority.