

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 intellectual 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 Seed Regulation and Quality Control Wing of SCA is publishing a Variety Testing Manual for seven notified crops (rice, wheat, jute, potato, sugarcane, 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 and Grow-out tests. Valuable suggestions from every corner will be cordially accepted for its improvement in next edition.

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

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Director

ACRONYMS

MoA	= Ministry of Agriculture
SCA	= Seed Certification Agency
DAE	= Department 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)
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 the breeders 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 in 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 five hundred Tk. 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 AND GROW-OUT TEST

A pre-post control and 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 and 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 lots 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 and 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 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 Certification Officer of SCA serve as Seed Inspector as described in The Seed Rules, 1998 & The Seed Ordinance, 1977.

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

If VCU tests are 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 this present situation the partial or incomplete VCU testing system is running on. In the name of farmers benefit, in future this system should 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 recently 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 procedures 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 be inferred from the plots by noting variation and segregation within the grown form of 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.

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

- | | | |
|-----|---|-------|
| 15. | Lower glume: beak length (3 rd spikelet upward from middle of the spike)
Code 3 for short (1-5mm)
Code 5 for medium (5.1-12mm)
Code 7 for long (12.1mm and above) | 80-92 |
| 16. | Lower glume: beak spicules
Code 1 for absent
Code 9 for present | 80-92 |
| 17. | Lower glume: shoulder shape
Code 1 for slope
Code 5 for square
Code 9 for elevated | 80-92 |
| 18. | Lower glume: shoulder width
Code 3 for narrow
Code 5 for medium
Code 7 for wide | 80-92 |
| 19. | Lower glume: keel inflection
Code 1 for absent
Code 9 for present | 80-92 |
| 20. | Lower glume: internal hair group
(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) | 80-92 |
| 21. | Spike length
Code 3 for short (<10cm)
Code 5 for medium (10.1-12cm)
Code 7 for long (>12.1cm) | 80-92 |
| 22. | Awn length (At the tip of ear)
Code 1 for absent
Code 3 for short (3-5cm)
Code 5 for medium (5.1-7cm)
Code 7 for long (>7.1cm) | 80-92 |

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

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


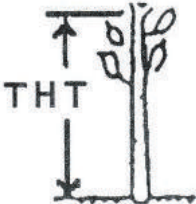
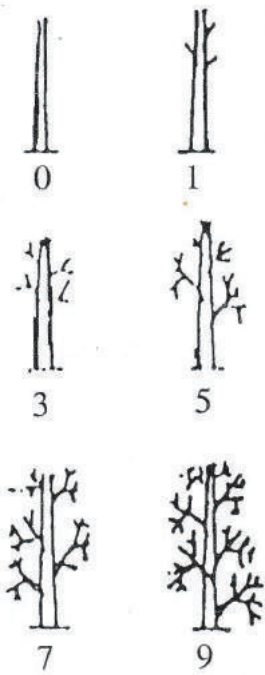
The following minimum list of characters in variety description and character stated described will be considered for the conduct of jute DUS tests:

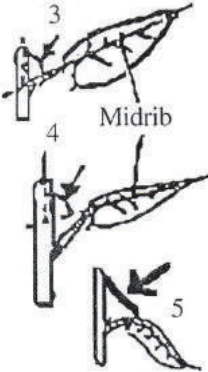
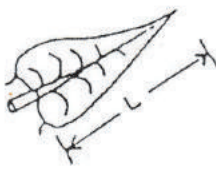

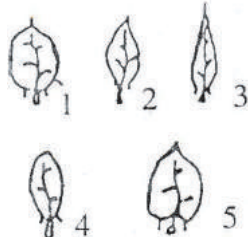
Table 9: List of characters in variety description for DUS test of Jute




SI 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 Foliateous	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 6 th 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= <i>Corchorus</i>	
2. SPP	SPECIES	CAP OLI	Name of species <i>C. capsularis</i> <i>C. olitorius</i>	
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	Green-no sign of any red pigmentation	60 days after sowing
		R	Red-includes the presence of red pigmentation on leaf margin	
9. VNCO	LEAF VEIN COLOUR	G	Green	60 days after sowing
		R	Red	
10. SNCO	BASAL SERRATION COLOUR	G	Green	60 days after sowing
		R	Red	
11. PTCO	LEAF PETIOLE COLOUR	G	Green	60 days after sowing
		R	Red	

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 6 th 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 6 th 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 6 th 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 6 th 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 1 Ovate 2 Ovate - lanceolate 3 Lanceolate 4 Elliptical 5 Cordate 6 Other (specify)	At pre -bud stage

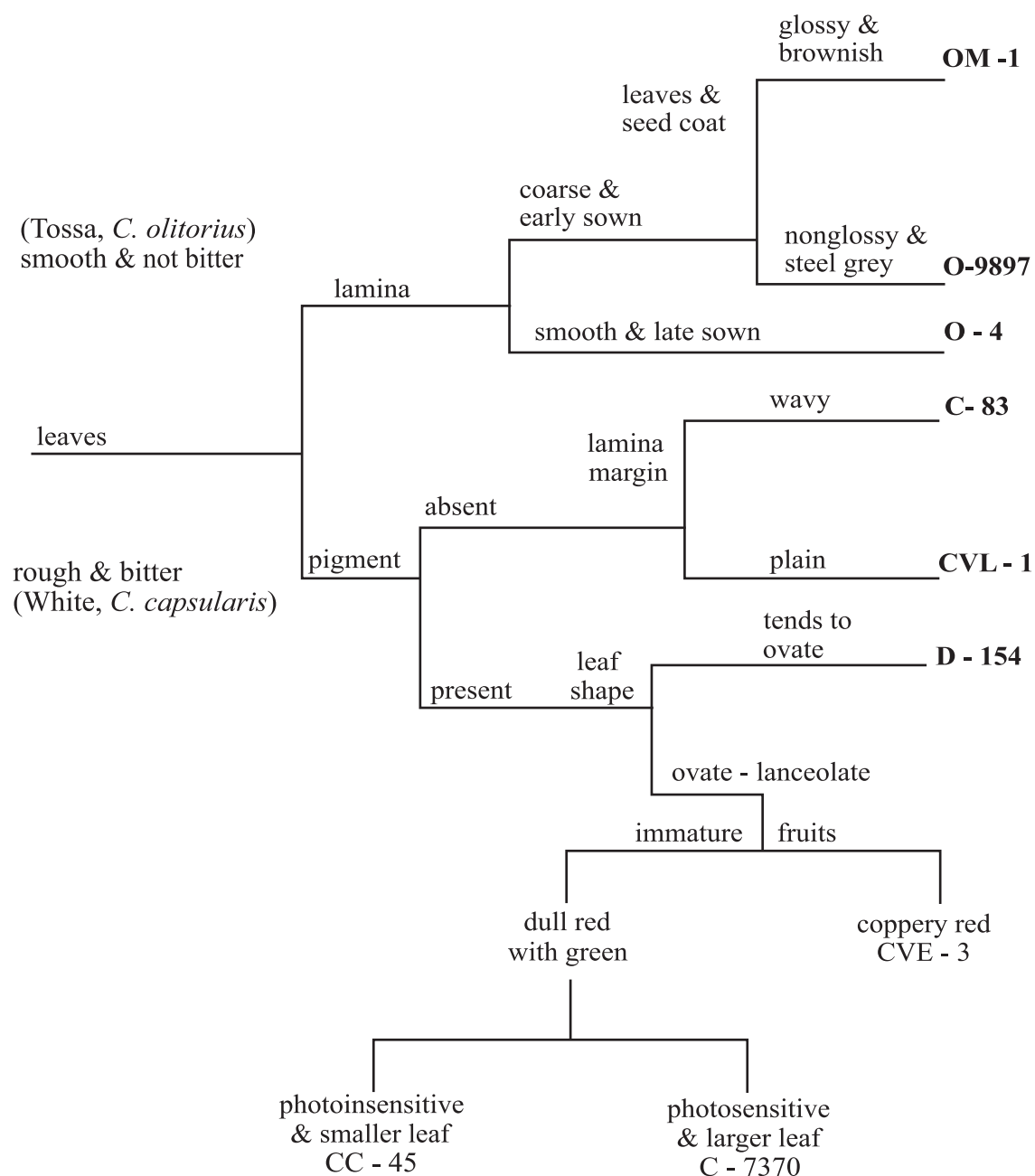
DESCRIPTOR (ON PRINT OUT)	DESCRIPTION (FULL NAME)	CODE	GUIDE	GROWTH STAGE
21. PTLN	PETIOLE LENGTH	**	Measurement in cm. using same 10 leaves as in Descriptor no. 17	At pre-bud stage
22. BUCO	PIGMENTATION OF FLOWER BUDS (CALYX)	G R	Green Red	At appearance of flower buds on all 10 plants
23. FLGDAT	FLOWERING 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 <i>C. capsularis</i> Blue-most frequent in <i>C. oplitorius</i>	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**