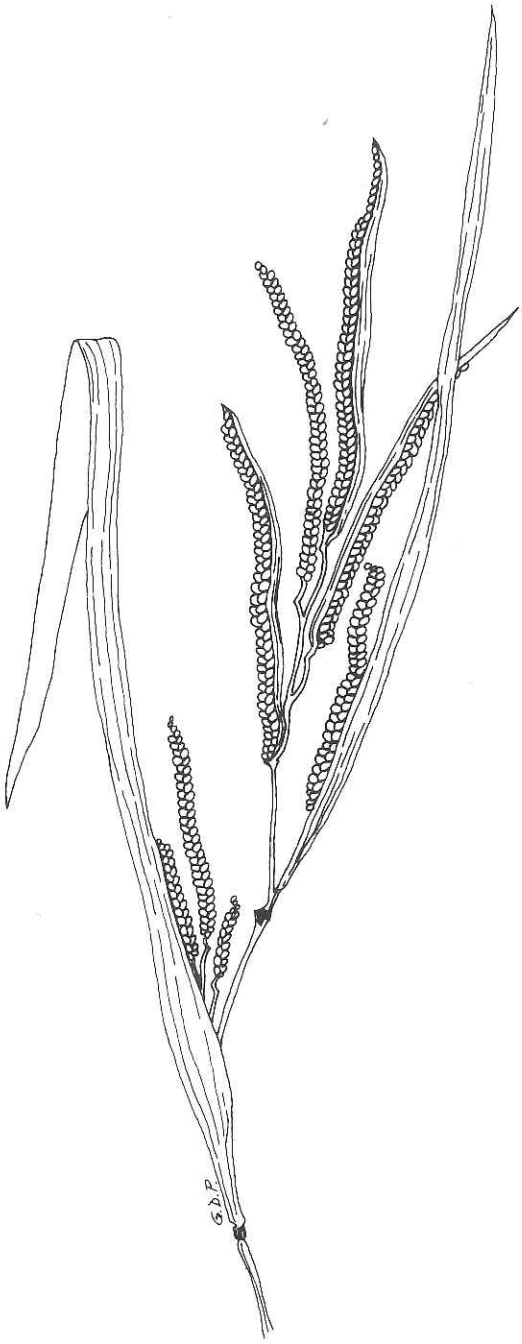

KODO MILLET DESCRIPTORS

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October 1983

INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

DESCRIPTIONS FOR KODO MILLET

IBPGR SECRETARIAT
Rome 1983

The International Board for Plant Genetic Resources (IBPGR) is an autonomous, international, scientific organization under the aegis of the Consultative Group on International Agricultural Research (CGIAR). The IBPGR, which was established by the CGIAR in 1974, is composed of its Chairman and 16 members; its Executive Secretariat is provided by the Food and Agriculture Organization of the United Nations. The basic function of the IBPGR, as defined by the Consultative Group, is to promote an international network of genetic resources centres to further the collection, conservation, documentation, evaluation and use of plant germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

IBPGR Executive Secretariat
Crop Genetic Resources Centre
Plant Production and Protection Division
Food and Agriculture Organization of the United Nations
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CONTENTS

PREFACE

This descriptor list for Kodo millet (*Paspalum scrobiculatum* L.) has been prepared in an IBPGR standard format following advice on descriptors and descriptor states from the crop experts throughout the world. The IBPGR encourages the collection of data on the first four categories of this list; 1. Accession; 2. Collection; 3. and 4. Characterization and preliminary evaluation. The IBPGR endorses the information in categories 1 - 4 as the minimum that ideally should be available for any one accession. Other descriptors are given in categories 5 onwards that will enable the simple encoding of further characterization and evaluation data and which can serve as examples for the creation of additional descriptors in the IBPGR form by any user.

Although the suggested coding should not be regarded as the definitive scheme, this format has the full backing of the IBPGR and is promoted worldwide. The descriptor list given here provides an international format and thereby produces a universally understood 'language' for all plant genetic resource data. The adoption of this scheme for all data encoding, or at least the production of a transformation method to convert other schemes to the IBPGR format, will produce a rapid, reliable and efficient means for information storage, retrieval and communication. This will greatly assist the utilization of germplasm throughout the international plant genetic resources network. It is recommended, therefore, that information should be produced by

closely following this descriptor list with regard to: ordering and numbering descriptors; using the descriptors specified; and using the descriptor states recommended.

Any suggestions for modifications will be welcomed by the IBPGR Secretariat, Rome.

DESCRIPTOR LIST FOR KODO MILLET

The IBPGR now uses the following definitions in genetic resources documentation:

i) passport data (accession identifiers and information recorded by collectors);

ii) characterization (consists of recording those characters which are highly inheritable, can be easily seen by the eye and are expressed in all environments);

iii) preliminary evaluation (consists of recording a limited number of additional traits thought desirable by a consensus of users of the particular crop).

Characterization and preliminary evaluation will be the responsibility of the curators, while further characterization and evaluation should be carried out by the plant breeder. The data from further evaluation should be fed back to the curator who will maintain a data file.

The following internationally accepted norms for the scoring or coding of descriptor states should be followed as indicated below:

a) measurements are made in metric units:

b) many descriptors which are continuously variable are recorded on a 1-9 scale. The authors of this list have sometimes described only a selection of the states, e.g. 3, 5 and 7 for such descriptors. Where this has occurred the full range of codes is available for use by extension of the codes given or by interpolation between them - e.g. in 8. (Pest and disease susceptibility) 1 = extremely low susceptibility and 8 = high to extremely high susceptibility;

c) presence/absence of characters are scored as + (present) and 0 (absent);

d) for descriptors which are not generally uniform throughout the accession (e.g. mixed collection, genetic segregation) mean and standard deviation could be reported where the descriptor is continuous or mean and 'x' where the descriptor is discontinuous;

e) when the descriptor is inapplicable, '0' is used as the descriptor value. E.g. if an accession does not form flowers, a 0 would be scored for the following descriptor.

Flower colour	
1	White
2	Yellow
3	Red
4	Purple

f) blanks are used for information not yet available.

g) standard colour charts e.g. Royal Horticultural Society Colour Chart, Methuen Handbook of Colour, Munsell Color Charts for Plant Tissues are strongly recommended for all ungraded colour characters (the precise chart used should be specified in the NOTES descriptor, 11).

PASSPORT

1. ACCESSION DATA

1.1 ACCESSION NUMBER

This number serves as a unique identifier for accessions and is assigned by the curator when an accession is entered into his collection. Once assigned this number should never be re-assigned to another accession in the collection. Even if an accession is lost, its assigned number is still not available for re-use. Letters should occur before the number to identify the genebank or national system (e.g. MG indicates an accession comes from the gene-bank at Bari, Italy, PI indicates an accession within the USA system).

1.2 DONOR NAME

Name of institution or individual responsible for donating the germplasm

1.3 DONOR IDENTIFICATION NUMBER

Number assigned to accession by the donor

1.4 OTHER NUMBERS ASSOCIATED WITH THE ACCESSION

(other numbers can be added as 1.4.3 etc.)

Any other identification number known to exist in other collections for this accession, e.g. USDA Plant Inventory number (not collection number, see 2.1)

1.4.1 Other number 1

1.4.2 Other number 2

1.5 SCIENTIFIC NAME

1.5.1 Genus

1.5.2 Species

1.5.3 Subspecies

1.5.4 Botanical variety

1.5.5 Cultivated race

1.6 PEDIGREE/CULTIVAR NAME

Nomenclature and designations assigned to breeder's material

1.7 ACQUISITION DATE

The month and year in which the accession entered the collection, expressed numerically, e.g. June = 06, 1981 = 81

1.7.1 Month

1.7.2 Year

1.8 DATE OF LAST REGENERATION OR MULTIPLICATION

The month and year expressed numerically, e.g. October = 10, 1978 = 78

1.8.1 Month

1.8.2 Year

1.9 ACCESSION SIZE

Approximate number of seeds of accession in collection

1.10 NUMBER OF TIMES ACCESSION REGENERATED

Number of regenerations or multiplications since original collection

2. COLLECTION DATA

2.1 COLLECTOR'S NUMBER

Original number assigned by collector of the sample normally composed of the name or initials of the collector(s) followed by a number. This item is essential for identifying duplicates held in different collections and should always accompany sub-samples wherever they are sent.

2.2 COLLECTING INSTITUTE

Institute or person collecting/sponsoring the original sample

2.3 DATE OF COLLECTION OF ORIGINAL SAMPLE

Expressed numerically, e.g. March = 03, 1980 = 80

2.3.1 Month

2.3.2 Year

2.4 COUNTRY OF COLLECTION OR COUNTRY WHERE CULTIVAR/VARIETY BRED

Use the three letter abbreviations supported by the Statistical Office of the United Nations. Copies of these abbreviations are available from the IBPGR Secretariat and have been published in the FAO/IBPGR Plant Genetic Resources Newsletter number 49.

2.5 PROVINCE/STATE

Name of the administrative subdivision of the country in which the sample was collected

2.6 LOCATION OF COLLECTION SITE

Number of kilometres and direction from nearest town, village or map grid reference (e.g. TIMBUKTU7S means 7 km south of Timbuktu)

2.7 LATITUDE OF COLLECTION SITE

Degrees and minutes followed by N (North) or S (South) e.g. 1030S

2.8 LONGITUDE OF COLLECTION SITE

Degrees and minutes followed by E (East) or W (West), e.g. 7625W

2.9 ALTITUDE OF COLLECTION SITE

Elevation above sea level in metres

2.10 COLLECTION SOURCE

1 Wild
2 Farm land
3 Farm store
4 Backyard
5 Village market
6 Commercial market
7 Institute
8 Other (specify in the NOTES descriptor, 11)

2.11 STATUS OF SAMPLE

1 Wild
2 Weedy
3 Breeders line
4 Primitive cultivar (landrace)
5 Advanced cultivar (bred)
6 Other (specify in the NOTES descriptor, 11)

2.12 LOCAL/VERNACULAR NAME

Name given by farmer to cultivar/landrace/weed

2.13 NUMBER OF PLANTS SAMPLED

Approximate number of plants collected in the field to produce this accession

2.14 PHOTOGRAPH

Was a photograph taken of the accession or environment at collection?

0 No
+ Yes

2.15 TYPE OF SAMPLE

1 Vegetative
2 Seed
3. Both

2.16 HERBARIUM SPECIMEN

Was a herbarium specimen collected?

0 No
+ Yes

2.17 ORGAN USED AS PRIMARY PRODUCT

1 Green fodder
2 Dry fodder
3 Grain

2.18 CULTURAL PRACTICES

1 Rainfed
2 Irrigated
3 Other (specify in the NOTES descriptor, 11)

2.19 CROPPING SYSTEM

1 Sole crop
2 Inter crop
3 Mixed crop
4 Sequence crop

2.20 SOIL

1 Sandy, sand and loam
2 Loam and silt loam
3 Clay loam, clay and silt
4 Highly organic
5 Other (specify in the NOTES descriptor, 11)

2.21 TOPOGRAPHY

1 Plains
2. Hills
3. Other (specify in the NOTES descriptor, 11)

2.22 OTHER NOTES FROM COLLECTOR

Collectors will record ecological information. For cultivated crops, cultivation practices such as irrigation, season of sowing, etc., will be recorded.

CHARACTERIZATION AND PRELIMINARY EVALUATION DATA

3. SITE DATA

3.1 COUNTRY OF CHARACTERIZATION AND PRELIMINARY EVALUATION

3.2 SITE (RESEARCH INSTITUTE)

3.3 NAME OF PERSON IN CHARGE OF CHARACTERIZATION

3.4 SOWING DATE

3.4.1 Day

3.4.2 Month

3.4.3 Year

3.5 HARVEST DATE

3.5.1 Day

3.5.2 Month

3.5.3 Year

4. PLANT DATA

4.1 VEGETATIVE

4.1.1 Growth habit

1 Erect

2 Decumbent

3 Prostrate

4.1.2 Plant height

In centimetres from ground level to tip of inflorescence; in case of decumbent or prostrate plants, length of flowering culm from rooted base

4.1.3 Number of basal tillers

Number of tillers at ground level or from the basal nodes

4.1.4 Degree of culm branching

3 Low branch number (upper one to four nodes rarely branched)

5 Medium branch number (upper two to four nodes produce inflorescences)

7 High branch number (most nodes produce inflorescences)

4.1.5 Blade length of flag leaf

In millimetres measured from ligule to tip of flag leaf at first primary axis node

4.1.6 Degree of lodging at maturity

3 Low

5 Intermediate

7 High

4.1.6 Senescence

Degree to which the plant is still green at time the primary inflorescence on each culm (tiller) is reaching maturity

3 Actively growing

7 Dead

4.2 INFLORESCENCE AND FRUIT

4.2.1 Length of peduncle

In millimetres

4.2.2 Length of inflorescence

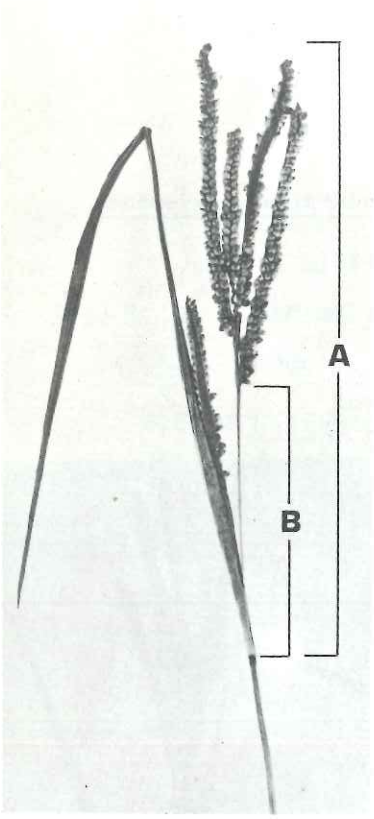
In millimetres measured from node of lowest raceme (thumb) to tip of last raceme. See Figure 1.

4.2.3 Width of inflorescence

In millimetres

4.2.4 Days to flowering

Counted as days from sowing (or first day of rain after planting) to 50% of plants in flower



A Length of inflorescence (4.2.2)

B Length of sterile primary axis between first and second nodes (4.2.6)

Figure 1. Inflorescence measurements

4.2.5 Number of racemes at basal inflorescence node (thumb)

4.2.6 Length of sterile primary axis between first and second nodes

In millimetres measured from basal thumb node to the next raceme (the second

primary axis node)

See Figure 1

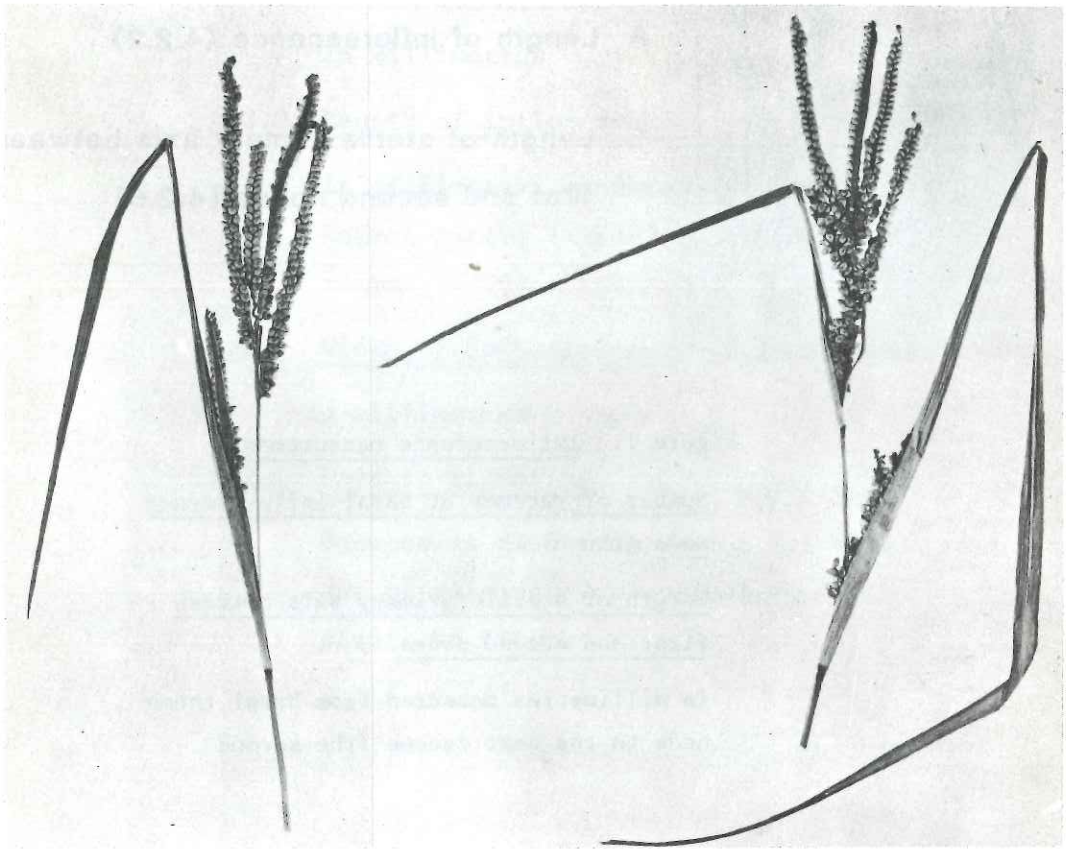
4.2.7 Flag leaf at the second primary axis node

See Figure 2

0 Absent

1 Rudimentary

2 Well-developed



0 Absent 2 Well-developed

Figure 2. Flag leaf at the second primary axis node

4.2.8 Number of racemes above thumb

Number of racemes above first (lowest) primary axis node

4.2.9 Length of thumb

In millimetres, the thumb is the basal raceme at the first (lowest) primary axis node

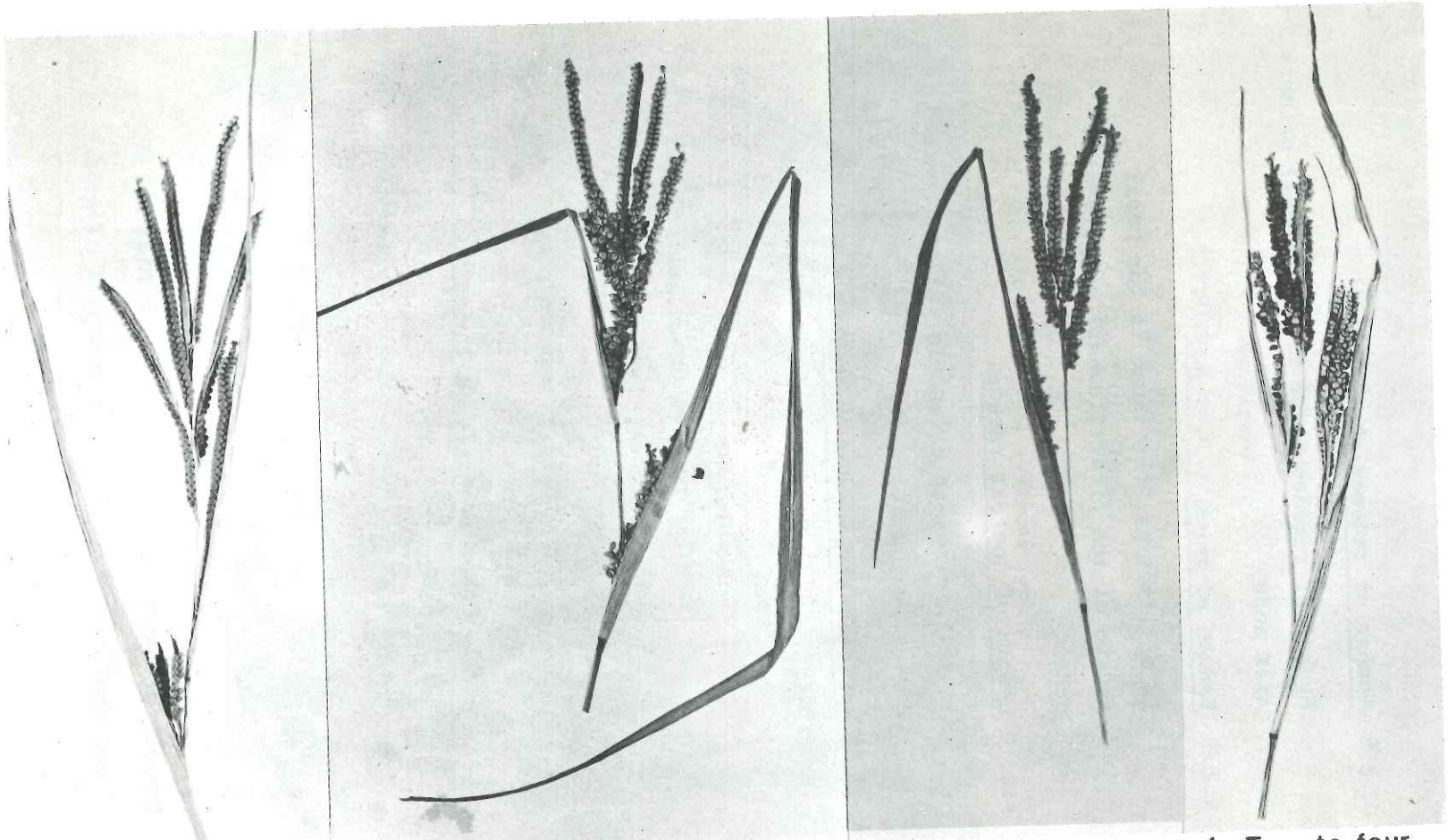
4.2.10 Length of longest raceme

In millimetres on principle inflorescence excluding thumb

4.2.11 Spikelet arrangement on rachis

See Figure 3

1 Regular rows
2 Regular rows in upper half of inflorescence, irregular rows in lower half
3 Two to three irregular rows
4 Two to four irregular rows
5 Other (specify in the NOTES descriptor, 11)



1 Regular rows

2 Regular rows in upper half of inflorescence, irregular rows in lower half

3 Two to three irregular rows

4 Two to four irregular rows

Figure 3. Spiklet arrangement on rachis

FURTHER CHARACTERIZATION AND EVALUATION

5. SITE DATA

5.1 COUNTRY OF FURTHER CHARACTERIZATION AND EVALUATION

5.2 SITE (RESEARCH INSTITUTE)

5.3 NAME OF PERSON IN CHARGE OF EVALUATION

5.4 SOWING DATE

5.4.1 Day

5.4.2 Month

5.4.3 Year

5.5 HARVEST DATE

5.5.1 Day

5.5.2 Month

5.5.3 Year

5.6 SOIL TYPE

5.7 RAINFALL DATA

5.8 PLANT SPACING

6. PLANT DATA

6.1 VEGETATIVE

6.1.1 Blade width of flag leaf

In millimetres measured at widest point of flag leaf at first primary axis node

6.1.2 Sheath length of flag leaf

In millimetres measured from internode

to lingule of flag leaf at first primary axis node

6.1.3 Sheath width

At flowering. Measured in millimetres at the centre of the sheath of the fourth leaf from the top

6.1.4. Sheath pigmentation

At flowering

0 Absent

+ Present

6.1.5 Sheath base pigmentation

At flowering

0 Absent

+ Pigmented

6.1.6 Juncture pigmentation

At flowering

0 Absent

+ Present

6.1.7 Internode pigmentation

At flowering

0 Absent

+ Present

6.1.8 Leaf number

At flowering. Number of nodes on the main tiller

6.1.9 Lamina (margin) pigmentation

At flowering

0 Absent

+ Present

6.1.10 Photosensitivity

0 Insensitive

3 Low

5 Intermediate

7 High

6.1.11 Green fodder yield

Consider tillering, height, leafiness, bulk and senescence (at maturity)

3 Poor

5 Intermediate

7 Good

6.1.12 Days to maturity

Number of days taken from planting to physiological maturity of 50 per cent of the main tillers

6.1.13 Yield of straw for fodder

In kilograms per hectare

6.2 INFLORESCENCE AND FRUIT

6.2.1 Glume

At flowering

1 Broad nerved (5 nerves)

2 Close nerved (7 nerves)

6.2.2 Ear exsertion

At dough stage

1 Complete

2 Partial

6.2.3 Ear appearance

At dough stage

3 Open

5 Semicompact

7 Compact

6.2.4 Spike branching

At dough stage

0 Absent

+ Present

6.2.5 Spikelet curvature

At flowering

1 Straight

2 Curved

6.2.6 Spikelet density

At dough stage. Number of spikelets per centimetre length of rachis at the centre of any spike

3 Sparse

5 Intermediate

7 Dense

6.2.7 Shattering of inflorescence

Percentage of spikelets remaining on racemes at time of full maturity

6.2.8 Uniformity of population maturity

Percentage of plants mature at harvest

6.2.9. Uniformity of individual plant maturity

Percentage of inflorescences mature on individual plants at harvest

6.3. SEED

6.3.1 Grain shape

Post harvest

1 Orbicular
2 Ellipsoidal
3 Oval
4 Other (specify in the NOTES descriptor, 11)

6.3.2 Grain colour

Post harvest

1 Golden brown
2 Brown
3 Dark brown
4 Other (specify in the NOTES descriptor,11)

6.3.3 Grain weight

Post harvest

Weight of 1000 grains in grams

6.3.4 Grain yield potential

At maturity. Consider spike number, size and density, seed number and size as compared to a standard check

3 Low
5 Intermediate
7 High

6.3.5 Grain yield

In kilograms per hectare

6.3.6 Protein content of grain

Post harvest. Per cent of dry matter using the factor 5.7

6.3.7 Lysine content of grain

Post harvest. Per cent of dry matter using the factor 5.7 for protein estimation

6.3.8 Methionine content of grain

Post harvest. Per cent of dry matter using the factor 5.y for protein estimation

6.3.9 Mineral content of grain

Post harvest. Per cent of dry matter

6.3.10 Calcium content of grain

Post harvest. Per cent of dry matter

7. STRESS SUSCEPTIBILITY

Scored on a 1-9 scale, where

3 Low susceptibility
5 Medium susceptibility
7 High susceptibility

7.1 LOW TEMPERATURE

7.2 HIGH TEMPERATURE

7.3 DROUGHT

7.4 HIGH SOIL MOISTURE

8. PEST AND DISEASE SUSCEPTIBILITY

Scored on a 1-9 scale, where

3 Low susceptibility
5 Medium susceptibility
7 High susceptibility

8.1 PESTS

8.1.1	*Lemna downesi* Baly	Beetle
8.1.2	*Atherigona simplex* Thompson	Shootfly
8.1.3	*Atherigona oryzae* Malloch	"
8.1.4	*Atherigona pulla* Wiedemann	"
8.1.5	*Atherigona butuberculata*	"
8.1.6	*Mythimna separata* Wlk.	Cut worm
8.1.7	*Marasmia trapezalis* Guenee	Leaf folder
8.1.8	*Kolla mimica* Dist.	Jassids
8.1.9	*Exitianus sp.*	"
8.1.10	*Hecalus sp.*	"

8.1.11	Cicadella spectra Bist.	Jassids
8.1.12	Orseolia sp.	Gallfly
8.1.13	Itonida paspalumi	"
8.1.14	Parallelodiplosis paspali	"
8.1.15	Leptocorisa acuta T.	Gundhi bug
8.1.16	Sesamia spp.	Stem borers
8.1.17	Grasshoppers	
8.1.18	Birds	
8.1.19	Others (specify in the NOTES descriptor, 11)	

8.3 FUNGI

8.2.1	Claviceps paspali Stev. & Hall	Ergot
8.2.2	Phyllachora winkleri Syd.	
8.2.3	Puccinia substriata Ell. & Barth	Rust
8.2.4	Sorosporium paspali McAlp.	Head smut
8.2.5	Myriogenospora paspali Atk.	Leaf spot
8.2.6	Helminthosporium holmii Luttrell	Leaf stripe
8.2.7	Helminthosporium maydis Nisikado & Miyake	Leaf spot
8.2.8	Helminthosporium turcicum Pass.	Leaf blight
8.2.9	Helminthosporium victoriae Meehan & Murphy	Leaf spot
8.2.10	Ephelis oryzae Syd.	Udbatta (at dough stage)
8.2.11	Phomopsis paspali	Grain toxin (at dough stage)
8.2.12	Others (specify in the NOTES descriptor, 11)	

8.3 BACTERIA

8.3.1	*Xanthomonas oryzae*	Bacterial leaf blight
8.3.2	Others (specify in the NOTES descriptor, 11)	

8.4 VIRUS

8.4.1	*Saccharum virus*	Sugarcane mosaic
8.4.2	*Zea virus*	Maize streak
8.4.3	Others (specify in the NOTES descriptor, 11)	

9. ALLOENZYME COMPOSITION

This may prove to be a useful tool for identifying duplicate accessions

10. CYTOLOGICAL CHARACTERS AND IDENTIFIED GENES

11. NOTES

Give additional information where descriptor state is noted as 'Other' as, for example, in descriptors 2.10, 4.2.9, etc. Also include here any further relevant information.

APPENDIX

LIST OF EXPERTS PROVIDING INPUT TO THE COMPILATION OF THIS LIST

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