DESCRIPTORS FOR SORGHUM

[*Sorghum bicolor* (L.) Moench]

IBPGR/ICRISAT
ROME 1993

The International Board for Plant Genetic Resources (IBPGR) is an autonomous international scientific organization operating under the aegis of the Consultative Group on International Agricultural Research (CGIAR). IBPGR was established by the CGIAR in 1974 and is administered by the Food and Agriculture Organization of the United Nations.

IBPGR's mandate is to advance the conservation and use of plant genetic resources for the benefit of present and future generations.

Financial support for the core programme of IBPGR was provided in 1992 by the Governments of Australia, Austria, Belgium, Canada, the People's Republic of China, Denmark, France, Germany, India, Italy, Japan, the Republic of Korea, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK, the USA and the World Bank

About ICRISAT: The semi-arids (SAT) encompasses parts of 48 developing countries including most of India, parts of southeast Asia, a swathe across sub-Saharan Africa, much of the southern and eastern Africa, and parts of Latin America. Many of these countries are among the poorest in the world. Approximately one sixth of the world's population lives in the SAT, which is typified by unpredictable weather, limited and erratic rainfall, and nutrient-poor soils.

ICRISAT's mandate crops are sorghum, pearl millet, finger millet, chickpea, pigeonpea, and groundnut; these six crops are vital to life for the ever-increasing populations of the semi-arids tropics. ICRISAT's mission is to conduct research which can lead to enhanced sustainable production of these crops and to improved management of the limited natural resources of the SAT. ICRISAT communicates information on technologies as they are developed through workshops, networks, training, library services, and publishing.

ICRISAT was established in 1972. It is one of the 18 nonprofit, research and training centers funded through the Consultative Group on International Agricultural Research (CGIAR). The CGIAR is an informal association of approximately 50 public and private sector donors; it is co-sponsored by the Food and Agriculture Organization of the United Nations (FAO), the World Bank, and the United Nations Development Programme (UNDP)

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PREFACE

Descriptors for sorghum [Sorghum bicolor *(L.) Moench]* is a revision of the original IBPGR and ICRISAT *Descriptor list for sorghum* (1980) and *Sorghum Descriptors* (1984). The 1980 list was based on a joint IBPGR-ICRISAT Advisory Committee on Sorghum and Millets Genetic Resources. The current list, though based on the 1980 list, has been revised by IBPGR and ICRISAT. Additional reviewers are listed in Contributors. The descriptors from the 1980 list are cross-referenced with the current list with the descriptor numbers in parentheses beside the current descriptor.

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. IBPGR endorses the information in categories 1-4 as the minimum that ideally should be available for any one accession. Descriptors given in categories 5 onwards enable the encoding of further characterization and evaluation data and can serve as examples to create additional descriptors in the IBPGR form. Management descriptors are intended for germplasm collections curators and may act as guidelines for the management of accessions in medium- and long-term storage and for their multiplication/regeneration.

Although the suggested coding should not be regarded as the definitive scheme, this format has the full backing of IBPGR and is promoted worldwide. This descriptor list serves as an international format and thereby produces a universally understood 'language' for all plant genetic resources data. By adopting this scheme to encode data, or producing a method of transformation for converting other schemes to the IBPGR format, a rapid, reliable and efficient means of information storage, retrieval and communication will be produced. This will assist the utilization of germplasm throughout the international plant genetic resources network. It is recommended that data be produced by using this descriptor list's descriptors and descriptor states, with the original order and numbering.

Any suggestions for modifications will be welcomed by IBPGR and ICRISAT.

DEFINITIONS AND USE OF THE DESCRIPTORS

IBPGR now uses the following definitions in genetic resources documentation:

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

(ii) characterization (consists of recording those characters which are highly heritable, can be 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);

(iv) further evaluation (consists of recording a number of additional descriptors thought to be useful in crop improvement);

(v) management (information indispensable for management of accessions in medium- and long-term storage as well as for multiplication/regeneration).

Characterization and preliminary evaluation will be the responsibility of genebank curators, while further characterization and evaluation will typically be carried out elsewhere (by a multidisciplinary team of scientists). The data from further evaluation should be fed back to the genebank which will maintain a data file.

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

(a) the SI system of measurements is used. The units to be applied are given in square brackets following the descriptor;

(b) many quantitative characters which are continuously variable are recorded on a 1-9 scale, where:

1	Very low
2	Very low to low
3	Low
4	Low to intermediate
5	Intermediate
6	Intermediate to high
7	High
8	High to very high
9	Very high

is the expression of a character. If the character is not expressed, '0' should be recorded (see also (e)). 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 Section 8 (Biotic stress susceptibility) 1 = very low susceptibility and 8 = high to very high susceptibility;

(c) for accessions which are not generally uniform throughout the descriptor (e.g. mixed collection, genetic segregation), the mean and standard deviation could be reported where the descriptor is continuous, or where the descriptor is discontinuous up to three codes in the order of frequency can be recorded;

(d) absence/presence of characters are scored as:

0	Absent
+	Present

(e) when the descriptor is inapplicable, '0' is used as the descriptor value, e.g. if an accession does not have a central leaf lobe, '0' would be scored for the following descriptor:

Shape of central leaf lobe

3	Toothed
5	Elliptic
7	Linear

(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 Chart for Plant Tissues, are strongly recommended for all ungraded colour characters (the precise chart used should be specified in the section where the colour chart is used);

(h) dates should be expressed numerically in the format DDMMYYYY, where

DD	-	2 digits to represent the day
MM	-	2 digits to represent the month
YYYY	-	4 digits to represent the year

PASSPORT

1. ACCESSION DATA

1.1 ACCESSION NUMBER

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

1.2 DONOR NAME (1.5)

Name of institution or individual responsible for donating the germplasm

1.3 DONOR NUMBER

Number assigned to accession by the donor

1.4 OTHER NUMBER(S) ASSOCIATED WITH THE ACCESSION (1.2-1.3-1.4)

Any other identification number known to exist in other collections for this accession, e.g. USDA Plant Inventory number (not COLLECTOR'S NUMBER, see 2.2). Other numbers can be added as 1.4.3, etc.

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 Authority

1.5.5 Race (3.1)

1	Bicolor	12	Guinea Durra
2	Guinea	13	Kafir Caudatum
3	Caudatum	14	Durra Caudatum
4	Kafir	15	Kafir Durra
5	Durra	16	*arundinaceum*
6	Guinea Bicolor	17	*virgatum*
7	Caudatum Bicolor	18	*verticilliflorum*
8	Kafir Bicolor	19	*aethiopicum*
9	Durra Bicolor	20	Anomalous
10	Guinea Caudatum	21	Others (specify in the NOTES descriptor, 1.14)
11	Guinea Kafir		

1.5.6 Group name (3.2)

1	Roxburghii	17	Milo
2	Shallu	18	Sudan grass
3	Conspicuum	19	Membranaceum
4	Guineense	20	Kafir
5	Margaritiferum	21	Hegari
6	Nervosum	22	Durra
7	Dochna	23	Subglabrescens
8	Kaoliang	24	Wani
9	Broom Corn	25	Cane
10	Feterita	26	Grain grass
11	Nigricans	27	Patcha jonna (yellow pericarp sorghums)
12	Dobbs		
13	Kaura	28	Fara-Fara
14	Zera-Zera	29	Others (specify in the NOTES descriptor, 1.14)
15	Nandyal		
16	Maldandi		

1.6 PEDIGREE (1.9)

Parentage, or nomenclature and designations assigned to breeders' material

1.7 CULTIVAR NAME (1.9)

Either a registered or other formal cultivar designation given to the accession

1.8 ACQUISITION DATE

Date on which the accession entered the collection (in the format DDMMYYYY)

1.9 DATE OF LAST REGENERATION OR MULTIPLICATION

(in the format DDMMYYYY)

1.10 ACCESSION SIZE

Approximate number or weight of seeds of an accession in the genebank

1.11 NUMBER OF TIMES ACCESSION REGENERATED

Since the date of acquisition

1.12 NUMBER OF PLANTS USED IN EACH REGENERATION

1.13 TYPE OF MAINTENANCE

1 Vegetative
2 Seed
3 Both
4 Tissue culture

1.14 NOTES

Specify here any additional information

2. COLLECTION DATA

2.1 COLLECTING INSTITUTE(S)

Institute(s) and people collecting/sponsoring the sample collection

2.2 COLLECTOR'S NUMBER (2.1)

Original number assigned by the collector(s) 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 be unique and always accompany subsamples wherever they are sent

2.3 COLLECTION DATE OF ORIGINAL SAMPLE (2.2)

(in the form DDMMYYYY)

2.4 COUNTRY OF COLLECTION (2.3)

Name of the country in which the sample was collected or was bred. Use three letter abbreviations from the *International Standard codes (ISO) for the representation of names of countries*, No. 3166, 1988. Copies of these are available from Beuth Verlag GmbH, Burggrafenstrasse 6, D-1000 Berlin 30, Germany; Tel. 30-2601-2320; Fax 30-2601-1231, Tlx. 1-83-622-bvb-d

2.5 PROVINCE/STATE (2.4)

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

2.6 DEPARTMENT/COUNTY

Name of the secondary administrative subdivision (within a Province/State) of the country in which the sample was collected

2.7 COLLECTION SITE (2.5)

Distance in kilometers and direction from the nearest town, village or map grid reference point (e.g. CURITIBA 7S means 7 km south of Curitiba)

2.8 LATITUDE OF COLLECTION SITE (2.6)

Degrees and minutes followed by N (North) or S (South) (e.g. 01030S)

2.9 LONGITUDE OF COLLECTION SITE (2.7)

Degrees and minutes followed by E (East) or W (West) (e.g. 07625W)

2.10 ELEVATION OF COLLECTION SITE [m] (2.8)

Altitude above sea level

2.11 COLLECTION SOURCE (2.11)

1 Wild habitat
2 Farmer's field
3 Farm store
4 Backyard
5 Market
6 Institute
7 Threshing yard
8 Others (specify in the descriptor COLLECTOR'S NOTES, 2.29)

2.12 STATUS OF SAMPLE (1.7)

1 Wild
2 Weedy
3 Breeding/research material
4 Landrace
5 Advanced cultivar
6 Interspecific derivative
7 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

2.13 NUMBER OF PLANTS SAMPLED

2.14 NUMBER OF HEADS COLLECTED

2.15 WEIGHT OF SEED COLLECTED [g]

2.16 CULTURAL PRACTICES (2.10)

1 Rainfed
2 Irrigated
3 Flooded
4 River banks
5 Transplanted
6 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

2.17 CROPPING SYSTEM

1 Monoculture
2 Mixed with cereals (specify crop)
3 Mixed with legumes (specify crop)
4 Mixed with other (specify crop)

2.18 PLANT POPULATION DENSITY

3 Low
5 Medium
7 High

2.19 LOCAL/VERNACULAR NAME (1.8)

Name given by farmer to crop and cultivar/landrace. State language and dialect if the ethnic group is not provided

2.20 ETHNIC GROUP

Name of the tribe of the farmer donating the sample or of the people living in the area of collection

2.21 USES OF THE ACCESSION

1 Grain
2 Flour
3 Stalk
4 Forage
5 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

2.22 COLLECTION SOURCE ENVIRONMENT

2.22.1 Growing period (state months)

2.22.2 Maturity

2.22.3 Vigour

3 Low
7 High

2.22.4 Topography

1 Swamp
2 Flood plain
3 Plain level
4 Undulating
5 Hilly
6 Mountainous
7 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

2.22.5 Soil fertility

3 Poor
7 Good

2.22.6 Soil moisture

3 Low
7 High

2.22.7 Soil *p*H

Actual value of the soil in the root zone around the accession

2.22.8 Soil texture

1 Highly organic
2 Clay
3 Clay silt
4 Silt
5 Silt sand
6 Sandy
7 Sandy loam
8 Loam
9 Gravelly

2.22.9 Soil drainage

3 Poor
7 Good

2.22.10 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

2.23 CLIMATE OF COLLECTION SITE (2.9)

Troll's classification system for world climates based on broad rainfall groups in relation to potential evapotranspiration will be used. (A humid month is defined as a month with mean rainfall exceeding potential evapotranspiration)

[1] Troll, C., *World Maps of Climatology*, pp. 27-28, Heidelberg, New York, 1965

1 Tropical rainy (with rainy season of 9.5 to 12 humid months and without short interruptions. Ever-green tropical rain-forests and half-deciduous transition woods)

2 Tropical humid-summer (with 7 to 9.5 humid months; rain-green forests and humid grass savannahs)

3 Tropical winter-humid (with 7 to 9.5 humid months; half deciduous transition woods)

4 Wet-dry tropical (with 4.5 to 7 humid months; rain green dry wood and dry savannah)

5 Tropical dry (with 2 to 4.5 humid months; tropical thorn-succulent wood and savannah)

6 Tropical dry (with humid months in winter)

7 Tropical semi-desert and desert (with less than 2 humid months; tropical semi-desert and deserts)

2.23.1 Temperature range [°C]

2.23.2 Rainfall range [mm] (2.9.1)

2.23.3 Rainfall distribution (2.9.2)

1 Uniform
2 Unimodel
3 Bimodel

2.23.4 Rainfall dependability (2.9.3)

1 No (erratic)
2 Yes (assured)

2.23.5 Wind [km sec^{-1}]

2.23.6 Frost

Number of frost-free days during growing season

2.23.7 Light

3 Shady
7 Sunny

2.24 PHOTOGRAPH

Was a photograph taken of the accession or habitat at the time of collection? If so, provide an identification number in the descriptor COLLECTOR'S NOTES, 2.29

0 No
+ Yes

2.25 HERBARIUM SPECIMEN

Was a herbarium specimen collected? If so, provide an identification number in the descriptor COLLECTOR'S NOTES, 2.29

0 No
+ Yes

2.26 ASSOCIATED CROPS

Other dominant crop species, found at and around the collection site

2.27 PREVAILING STRESSES

Information on associated biotic and abiotic stresses and accession's reaction

2.28 FREQUENCY OF ACCESSION AT COLLECTION SITE

1 Rare
3 Occasional
5 Frequent
7 Abundant
9 Very abundant

2.29 COLLECTOR'S NOTES

Additional information recorded by the collector or any specific information on any state in any of the above descriptors

CHARACTERIZATION AND PRELIMINARY EVALUATION

3. SITE DATA

3.1 COUNTRY

(See instructions in COUNTRY OF COLLECTION, 2.4)

3.2 SITE (RESEARCH INSTITUTE) (4.1)

3.2.1 Latitude

(See format under 2.8)

3.2.2 Longitude

(See format under 2.9)

3.2.3 Elevation [m]

3.2.4 Name of farm or institute

3.3 EVALUATOR'S NAME AND ADDRESS

3.4 SOWING DATE (4.2)

(in the format DDMMYYYY)

3.5 HARVEST DATE

(in the format DDMMYYYY)

3.6 EVALUATION ENVIRONMENT

Environment in which characterization/preliminary evaluation was carried out

1 Field
2 Screenhouse
3 Glasshouse
4 Laboratory
5 Other (specify in the descriptor NOTES, 3.19)

3.7 PERCENTAGE SEED GERMINATION [%]

3.8 PERCENTAGE FIELD ESTABLISHMENT [%]

3.9 NUMBER OF DAYS TO 50% GERMINATION

3.10 SOWING SITE IN FIELD

Give block, strip and/or row/plot numbers as applicable

3.11 FIELD SPACING

3.11.1 Distance between plants in a row [cm]

3.11.2 Distance between rows [cm]

3.12 SOIL TEXTURE

1 Highly organic
2 Clay
3 Clay silt
4 Silt
5 Silt sand
6 Sandy
7 Sandy loam
8 Loam
9 Gravelly

3.13 SOIL *p*H

Actual value of the soil in the root zone around the accession

3.14 SOIL TAXONOMIC CLASSIFICATION

As detailed a classification as possible should be given. This may be taken from a soil survey map. State name (e.g. Alfisols, Spodosols, Fluvisols, etc.)

3.15 WATERING

1 Irrigated
2 Rainfed
3 Both/alternate

3.16 FERTILIZER

(Specify name and dose)

3.17 PLANT PROTECTION

(Specify pesticides used and dose of each)

3.18 CLIMATE (during growing season)

3.18.1 Temperature range [°C]

3.18.2 Heat unit during crop season

3.18.3 Rainfall range [mm]

3.18.4 Sunshine hours

3.19 NOTES

Any other site-specific information

4. PLANT DATA

4.1 VEGETATIVE

4.1.1 Plant height [cm] (4.4)

Of main stalk at 50% flowering. Mean of 10 randomly selected plants. See Fig. 1

4.1.2 Plant colour (3.4)

At harvest. Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

1 Pigmented (grey-brown group 199A; brown group 200D; 200C; 200B, 200A)
2 Tan (greyed-yellow group 161B)

4.1.3 Stalk juiciness (3.5)

0 Not juicy (dry)
+ Juicy

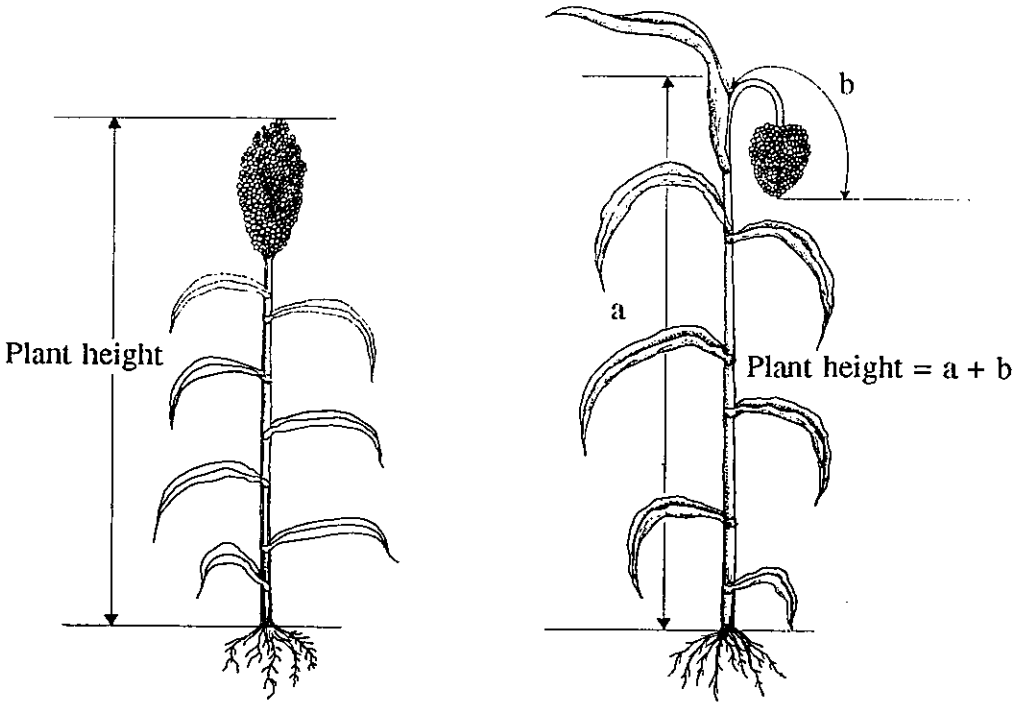


Fig. 1. Plant height

4.1.4 Juice flavour (3.6)

1 Sweet
2 Insipid

4.1.5 Leaf midrib colour (3.7)

Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

1 White (colourless) (white group 155B)
2 Dull green (greyed-green group 191C)
3 Yellow (yellow group 7A, 7B)
4 Brown (greyed-orange group 165C)
5 Purple (greyed-purple group 183D, 183C, 183B, 183A)
6 Other (specify in the NOTES descriptor, 4.4)

4.1.6 Waxy bloom

3 Slightly present
5 Medium
7 Mostly bloomy
9 Completely bloomy

4.2 INFLORESCENCE AND FRUIT

4.2.1 Days to flowering (4.5)

From emergence to when 50% of plants have started flowering

4.2.2 Inflorescence compactness and shape (3.8)

See Fig. 2

1 Very lax panicle (typical of wild sorghums)
2 Very loose erect primary branches
3 Very loose drooping primary branches
4 Loose erect primary branches
5 Loose drooping primary branches
6 Semi-loose erect primary branches
7 Semi-loose drooping primary branches
8 Semi-compact elliptic
9 Compact elliptic
10 Compact oval
11 Half broom corn
12 Broom corn
13 Other (specify in the NOTES descriptor, 4.4)

4.2.3 Glume colour (3.9)

At maturity. Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

1 White (white group 155D, 155C, 155B, 155A)
2 Sienna (yellow group 6D, 6C, 6B, 6A)
3 Mahogany (greyed-orange group 164B, 164A, 165B, 165A)
4 Red (orange-red group 33C, 33B, 33A, 34A)
5 Purple (greyed-purple group 183D, 183C, 183B, 183A)
6 Black (black group 202A; brown group 200A)
7 Grey (greyed-green group 197D, 197C)
8 Other (specify in the NOTES descriptor, 4.4)

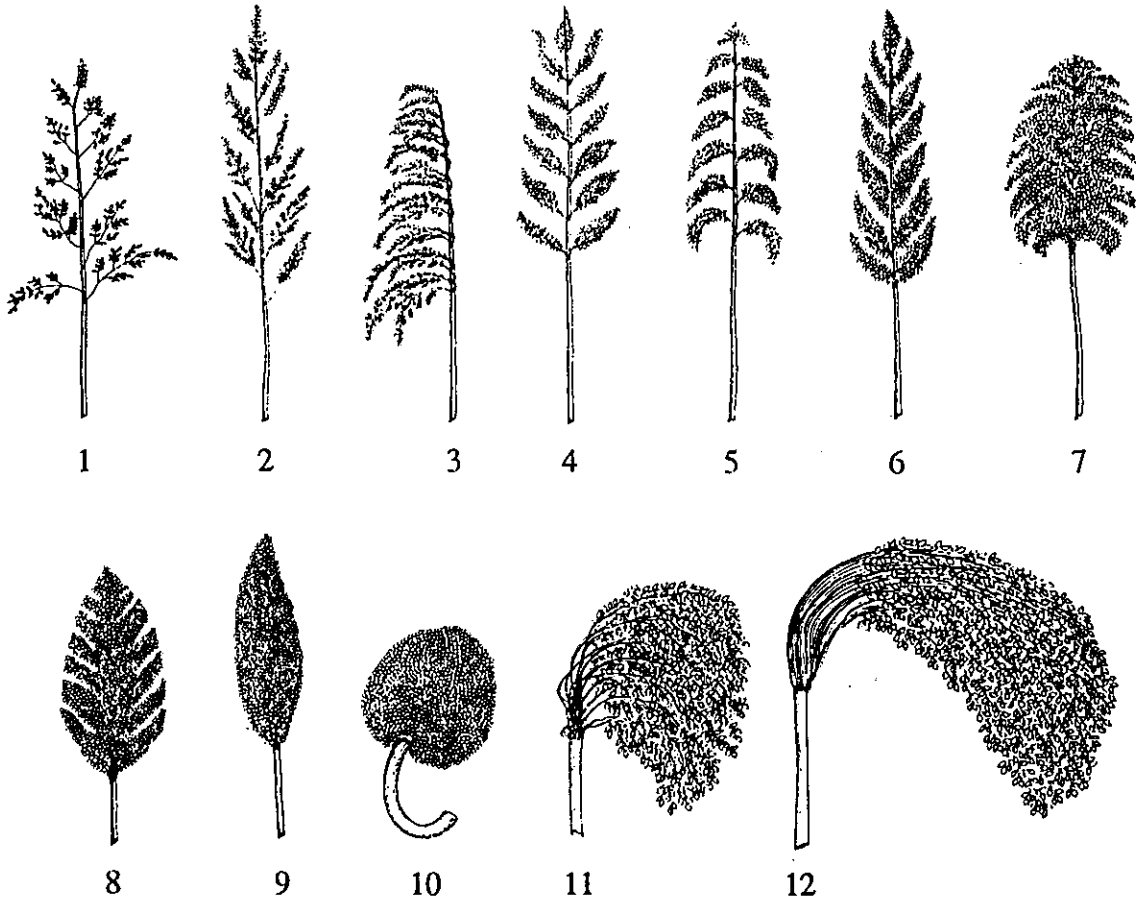
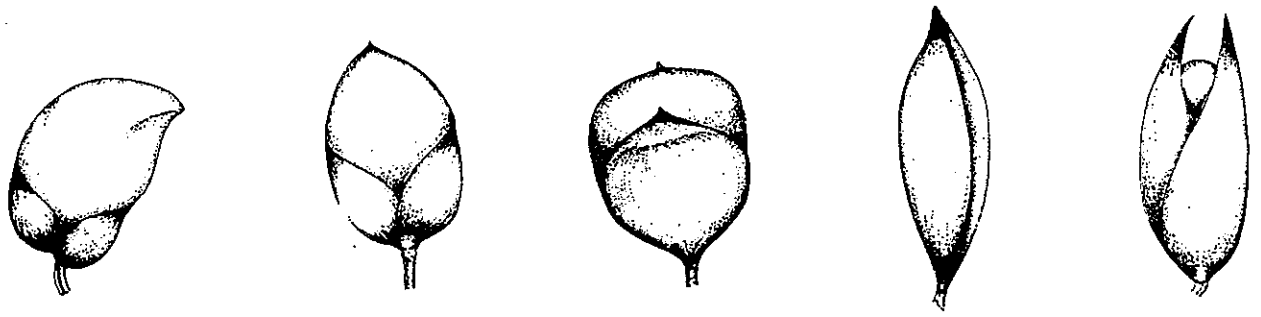


Fig. 2. Inflorescence compactness and shape

4.2.4 Grain covering (3.10)

Amount of grain covered by glumes. At maturity. See Fig. 3

1 25% grain covered
3 50% grain covered
5 75% grain covered
7 Grain fully covered
9 Glumes longer than grain



1 3 5 7 9

Fig. 3. Grain covering

4.2.5 Awns (3.11)

At maturity

0 Absent (awnless)
+ Present (awned)

4.2.6 Shattering (3.3)

1 Very low
3 Low
5 Intermediate
7 High
9 Very high

4.3 SEED (GRAIN)

4.3.1 Grain colour (3.12)

Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

1 White (white group 155D, 155C, 155B, 155A)
2 Yellow (yellow group 6D, 6C, 6B, 6A)
3 Red (orange-red group 33C, 33B, 33A, 165B, 165A)
4 Brown (greyed-orange group 164B, 164A, 165B, 165A)
5 Buff (greyed-orange group 166B)
6 Other (specify in the NOTES descriptor, 4.4)

4.3.2 Grain lustre (3.17)

0 Absent (not lustrous)
+ Present (lustrous)

4.3.3 100-seed weight [g] (3.13)

At 12% moisture content

4.3.4 Grain number per panicle

Average of five panicles in the plot

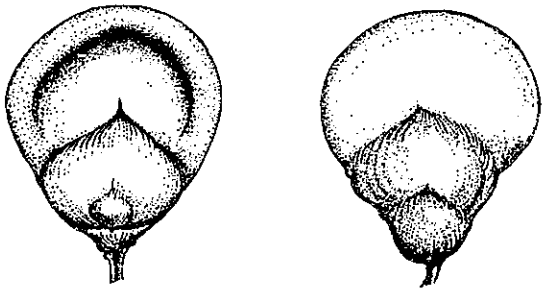
4.3.5 Grain sub-coat (3.18)

0 Absent
+ Present

4.3.6 Grain plumpness (3.19)

See Fig. 4

3 Dimple
7 Plump



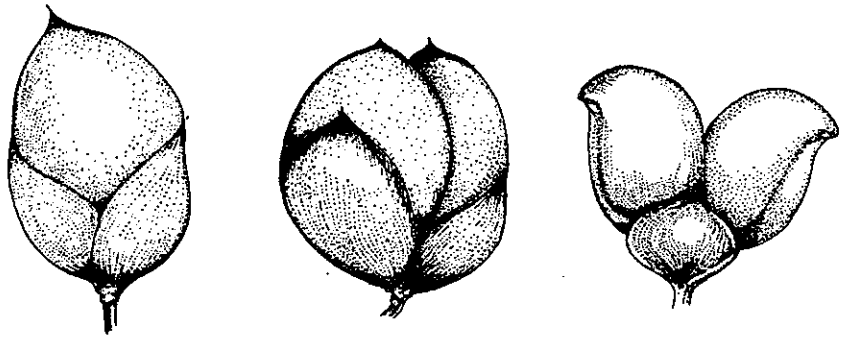
3 Dimple 7 Plump

Fig. 4. Grain plumpness

4.3.7 Grain form (3.20)

See Fig. 5

1 Single
2 Twin



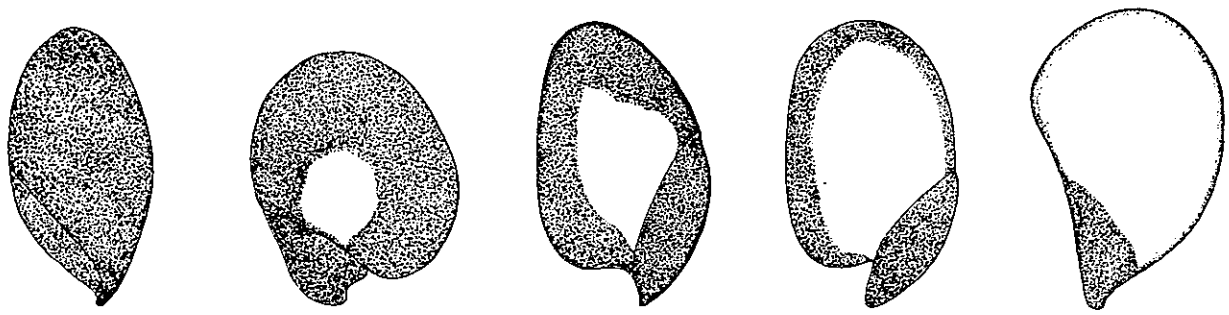
1 Single 2 Twin

Fig. 5. Grain form

4.3.8 Endosperm texture (3.14)

See Fig. 6

1 Completely corneous
3 Mostly corneous
5 Intermediate
7 Mostly starchy
9 Completely starchy



1 3 5 7 9

Fig. 6. Endosperm texture

4.3.9 Endosperm colour (3.15)

Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

1 White (white group 155B)
2 Yellow (greyed-yellow group 162A)

4.3.10 Endosperm type (3.16)

1 Normal
2 Waxy
3 Sugary

4.4 NOTES

Any additional information, especially in the category of 'other' under various descriptors above, may be specified here

FURTHER CHARACTERIZATION AND EVALUATION

5. SITE DATA

5.1 COUNTRY

(See instructions in COUNTRY OF COLLECTION, 2.4)

5.2 SITE (RESEARCH INSTITUTE)

5.2.1 Latitude

(See format under 2.8)

5.2.2 Longitude

(See format under 2.9)

5.2.3 Elevation [m]

5.2.4 Name of farm or institute

5.3 EVALUATOR'S NAME AND ADDRESS

5.4 SOWING DATE

(in the format DDMMYYYY)

5.5 HARVEST DATE

(in the format DDMMYYYY)

5.6 EVALUATION ENVIRONMENT

Environment in which further characterization and evaluation was carried out

1 Field
2 Screenhouse
3 Glasshouse
4 Laboratory
5 Other (specify in the descriptor NOTES, 5.19)

5.7 PERCENTAGE SEED GERMINATION [%]

5.8 PERCENTAGE FIELD ESTABLISHMENT [%]

5.9 NUMBER OF DAYS TO 50% GERMINATION

5.10 SOWING SITE IN FIELD

Give block, strip and/or row/plot numbers as applicable

5.11 FIELD SPACING

5.11.1 Distance between plants in a row [cm]

5.11.2 Distance between rows [cm]

5.12 SOIL TEXTURE

1 Highly organic
2 Clay
3 Clay silt
4 Silt
5 Silt sand
6 Sandy
7 Sandy loam
8 Loam
9 Gravelly

5.13 SOIL *p*H

Actual value of the soil in the root zone around the accession

5.14 SOIL TAXONOMIC CLASSIFICATION

As detailed a classification as possible should be given. This may be taken from a soil survey map. State name (e.g. Alfisols, Spodosols, Fluvisols, etc.)

5.15 WATERING

1 Irrigated
2 Rainfed
3 Both/alternate

5.16 FERTILIZER

(Specify name and dose)

5.17 PLANT PROTECTION

(Specify pesticides used and dose of each)

5.18 CLIMATE

5.18.1 Temperature range [°C]

5.18.2 Heat unit during crop season

5.18.3 Rainfall range [mm]

5.18.4 Sunshine hours

5.19 NOTES

Any other site-specific information

6. PLANT DATA

6.1 VEGETATIVE

6.1.1 Seedling vigour (4.3)

Observed 15 days after emergence

3 Low
5 Intermediate
7 High

6.1.2 Lodging susceptibility (4.14)

3 Low
5 Intermediate
7 High

6.1.3 Senescence (7.7)

Death of leaves and stalk at grain maturity

1 Very slightly senescent
3 Slightly senescent
5 Intermediate (about half of leaves dead)
7 Mostly senescent
9 Completely senescent (leaves and stalk dead)

6.1.4 Overall plant aspect (4.16)

Overall agronomic desirability of the accession as observed visually

3 Poor
5 Medium
7 Good

6.2 INFLORESCENCE AND FRUIT

6.2.1 Photosensitivity (4.6)

Recorded on the basis of rainy season (long days):post-rainy season (short days) ratios of plant height (4.1.1) and days to flowering (4.2.1)

3 Low
5 Intermediate
7 High

6.2.2 Number of flowering stems per plant (4.7)

From 10 randomly selected plants. Main stem considered as one

6.2.3 Synchrony of flowering (4.8)

0 No (not synchronous)
+ Yes (main stem and tillers at same time)

6.2.4 Inflorescence exsertion (4.9)

See Fig. 7

1 Slightly exserted (<2 cm but ligule of flag leaf definitively below inflorescence base)
2 Exserted (2-10 cm between ligule and inflorescence base)
3 Well-exserted (>10 cm between ligule and inflorescence base)
4 Peduncle recurved (inflorescence below ligule and clearly exposed splitting the leaf sheath)

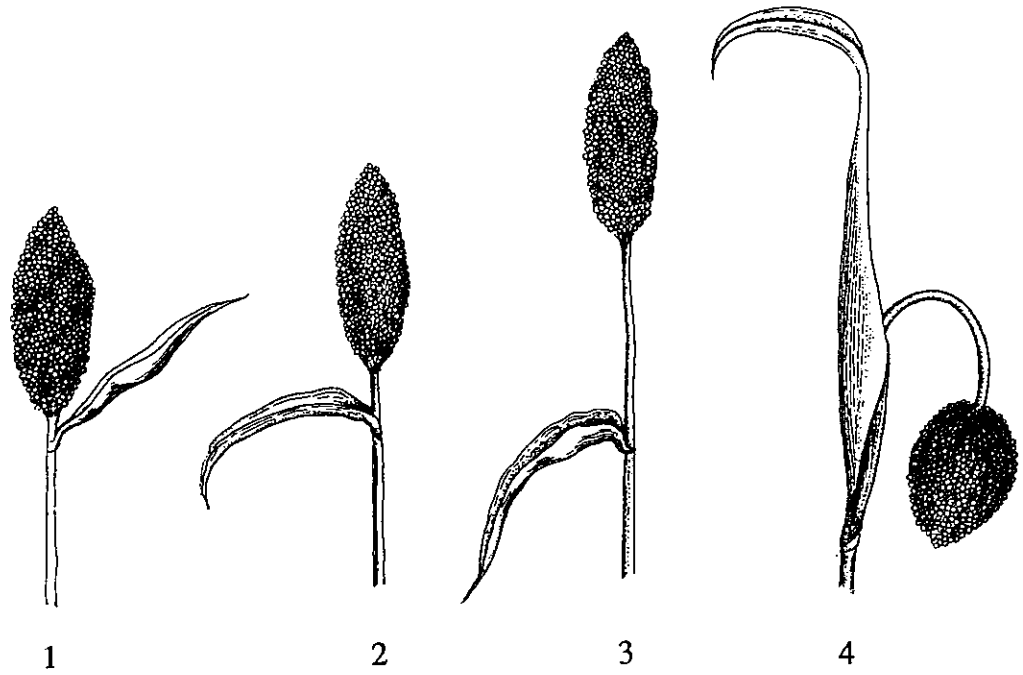


Fig. 7. Inflorescence exsertion

6.2.5 Inflorescence length [cm] (4.10)

From base of inflorescence (head) to tip. Mean of five randomly selected plants

6.2.6 Inflorescence width (head) [cm] (4.11)

In natural position at the widest part. Mean of five randomly selected plants

6.2.7 Restoration response (Milo source) (7.8)

The reaction of the F_1 plant when dusted with the pollen of the accession

1 Non-restorer
2 Partial restorer
3 Restorer

6.2.8 Male sterile cytoplasm system (7.9)

1 Milo
2 Texas
3 Maldandi

6.3 SEED

6.3.1 Grain hardness [kg] (4.13)

Weight required to crack the grain

6.3.2 Threshability [%] (4.12)

1 Very difficult (<50%)
3 Difficult (60-69%)
5 Intermediate (80-84%)
7 Good (90-94%)
9 Excellent (99-100%)

6.3.3 Grain weathering susceptibility (4.15)

3 Low (good resistance)
5 Medium
7 High (poor resistance)

6.3.4 Protein content (7.11)

(Absolute amount)

3 Low (<7.0 - 10.0)
7 High (>15.0 - 21.7)

6.3.5 Lysine content (7.12)

(Absolute amount)

3 Low (1.5 - 1.75)
7 High (3.0 - 3.65)

6.3.6 Tannin in grain (7.13)

1 Testa brown (greyed-orange group 165B, 165A)
2 Testa and pericarp brown (greyed-orange group 165B, 165A)

7. ABIOTIC STRESS SUSCEPTIBILITY

Scored under artificial and/or natural conditions, which should be clearly specified. These are coded on a susceptibility scale from 1 to 9 viz.:

1 Very low or no visible sign of susceptibility
3 Low
5 Intermediate
7 High
9 Very high

7.1 REACTION TO LOW TEMPERATURE

7.1.1 Seedling susceptibility (7.5)

Measured as reduction in seed germination at low temperatures (10°C to 15°C)

7.1.2 Reproductive susceptibility (7.6)

Measured as reduction in seed set at low temperatures (10°C to 15°C)

7.2 REACTION TO HIGH TEMPERATURE

7.3 REACTION TO DROUGHT (7.3)

7.4 REACTION TO HIGH SOIL MOISTURE

7.5 REACTION TO SALINITY (7.4)

7.6 REACTION TO SOIL ACIDITY (7.10)

8. BIOTIC STRESS SUSCEPTIBILITY

In each case, it is important to state the origin of the infestation or infection, i.e. natural, field inoculation, laboratory. Record such information in the NOTES descriptor, 8.6. Indicate the age of plant when damage is observed. These are coded on a susceptibility scale from 1 to 9 viz.:

1 Very low or no visible sign of susceptibility
3 Low
5 Intermediate
7 High
9 Very high

8.1 PESTS

	Causal organism	**Disease or common name**
8.1.1	*Atherigona soccata* Rond. Dead hearts at 21 and 28 days	Sorghum shoot fly (5.4)
8.1.2	*Chilo partellus* Swin. Leaf damage at 5 weeks Dead hearts at 7 weeks Tunnelling at harvest	Spotted stem borer (5.5.1-5.5.2-5.5.3)
8.1.3	*Busseola fusca* Fuller Leaf damage at 5 weeks Dead hearts at 7 weeks Tunnelling at harvest	Maize stalk borer (5.6.1-5.6.2-5.6.3)

	Causal organism	Disease or common name
	Sesamia spp. Leaf damage at 5 weeks Dead hearts at 7 weeks Tunnelling at harvest	(5.7.1-5.7.2-5.7.3)
8.1.4	*Diatraea saccharalis* (Fabr.) Leaf damage at 5 weeks Dead hearts at 7 weeks Tunnelling at harvest	Sugarcane borer (5.8.1-5.8.2-5.8.3)
8.1.5	*Contarinia sorghicola* (Coq.)	Sorghum midge (5.9)
8.1.6	*Calocoris angustatus* (Leth.) *Eurystylus immaculatus* Odh.	Earhead bug (5.10)
8.1.7	*Helicoverpa armigera* (Hub.)	African bollworm (5.11)
8.1.8	*Heliothis zea* (Boddie)	Corn earworm (5.12)
8.1.9	*Spodoptera* spp.	Armyworms (5.13-5.14)
8.1.10	*Mythimna separata* Wlk.	Oriental armyworms (5.15)
8.1.11	*Schizaphis graminum* (Rond.)	Greenbug (5.16)
8.1.12	*Rhopalosiphum maidis* (Fitch)	Corn leaf aphid (5.17)
8.1.13	*Melanaphis sacchari* (Zehnt.)	Sugarcane aphid (5.18)
8.1.14	*Blissus leucopterus leucopterus* (Say)	Chinch bug (5.19)
8.1.15	*Phyllophaga* spp. *Schizonycha* spp. *Holotrichia* spp.	White grubs (5.20-5.21-5.22)
8.1.16	*Celama sorghiella* Riley	Sorghum web worm (5.23)
8.1.17	*Stenachroia elongella* Hamps. *Eublemma* spp.	Web worm (5.24-5.25)

	Causal organism	Disease or common name
8.1.18	*Oligonychus indicus* Hirst	Sorghum mite (5.26)
8.1.19	*Oligonychus pratensis* (Banks)	Banks grass mite (5.27)
8.1.20	Grasshoppers	
8.1.21	Locusts	
8.1.22	Birds	
8.2	FUNGI	
8.2.1	*Ascochyta sorghi* Sacc.	Rough leaf spot (6.8)
8.2.2	*Cercospora sorghi* Ell.& Ev.	Grey leaf spot (6.9)
8.2.3	*Colletotrichum graminicola* (Ces.) Wilson	Anthracnose (6.7.1)
8.2.4	*Curvularia lunata* (Wakk.) Boed. *Fusarium* spp.	Grain moulds (6.16)
8.2.5	*Exserohilum turcicum* (Pass.) Leo & Suggs *Setosphaeria turcica* (Luttr.) Leo & Suggs *Helminthosporium turcicum* Pass.	Leaf blight (6.6)
8.2.6	*Bipolaris sorghicola* (Lefevre & Sherwin) Alcorn	Target leaf spot
8.2.7	*Ramulispora sorghicola* Harris	Oval leaf spot
8.2.8	*Phyllachora sacchari* Henn.	Tar spot
8.2.9	*Gloeocercospora sorghi* Bain & Edger. ex Deighton	Zonate leaf spot (6.12)
8.2.10	*Macrophomina phaseolina* (Tassi) Goid	Charcoal rot (6.4)
8.2.11	*Peronosclerospora sorghi* (West.& Upp.) C.G. Shaw	Downy mildew (6.5)

	Causal organism	Common name
8.2.12	*Phoma insidiosa* Tassi	Black dot grain mould (6.17)
8.2.13	*Puccinia purpurea* Cooke	Rust (6.11)
8 2.14	*Ramulispora sorghi* (Ell. & Ev.) Olive & Lefeb.	Sooty stripe (6.10)
8.2.15	*Sphacelia sorghi* McRae	Ergot (6.18)
8.2.16	*Sphacelotheca cruenta* (Kühn) Potter	Loose smut (6.22)
8.2.17	*Sphacelotheca reiliana* (Kühn) Clinton	Head smut (6.21)
8.2.18	*Sphacelotheca sorghi* (Link) Clinton	Grain smut (6.19)
8.2.19	*Tolyposporium ehrenbergii* (Kühn) Pat.	Long smut (6.20)
8.3	BACTERIA	
8.3.1	*Pseudomonas andropogoni* (E.F.Sm.) Stapp.	Bacterial leaf stripe (6.13)
8.3.2	*Pseudomonas syringae* pv. *syringae* van Hall	Bacterial leaf spot (6.14)
8.3.3	*Xanthomonas campestris* pv. *holcicola* (Elliot) Dye	Bacterial leaf streak
8.4	VIRUS	
8.4.1	Maize dwarf mosaic virus (MDMV)	
8.4.2	Sugarcane mosaic virus (SCMV)	
8.4.3	Johnsongrass mosaic virus	
8.4.4	Maize stripe virus (MStV)	
8.4.5	Maize mosaic virus (MMV)	

	Causal organism	Disease or common name	
8.5 PLANTS			
8.5.1	*Striga asiatica* (L.) O. Kuntze	Witchweed	(7.1)
	Striga densiflora Benth.		
	Striga hermonthica Benth.		(7.2)

8.6 NOTES

Specify here any additional information

9. ALLOZYME COMPOSITION

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

10. CYTOLOGICAL CHARACTERS AND IDENTIFIED GENES

MANAGEMENT

M1. SEED MANAGEMENT DATA

M1.1 ACCESSION NUMBER (Passport 1.1)

M1.2 POPULATION IDENTIFICATION (Passport 2.2)

Collector's number, pedigree, cultivar name, etc. depending on the population type

M1.3 STORAGE ADDRESS

(building, room, self numbers/location in medium and/or long-term storage)

M1.4 STORAGE DATE

(in the format DDMMYYYY)

M1.5 GERMINATION AT STORAGE (INITIAL) [%]

M1.6 DATE OF LAST GERMINATION TEST

(in the format DDMMYYYY)

M1.7 GERMINATION AT THE LAST TEST [%]

M1.8 DATE OF NEXT TEST

Date (estimate) when the accession should next be tested (in the format DDMMYYYY)

M1.9 MOISTURE CONTENT AT HARVEST [%]

M1.10 MOISTURE CONTENT AT STORAGE (INITIAL) [%]

M1.11 AMOUNT OF SEED IN STORAGE(S) [g or number] (Passport 1.10)

M1.12 DUPLICATION AT OTHER LOCATION(S) (Passport 1.4)

M2. MULTIPLICATION/REGENERATION DATA

M2.1 ACCESSION NUMBER (Passport 1.1)

M2.2 POPULATION IDENTIFICATION (Passport 2.2)

Collector's number, pedigree, cultivar name, etc. depending on the population type

M2.3 FIELD PLOT NUMBER

M2.4 LOCATION

M2.5 COLLABORATOR

M2.6 SOWING DATE

(in the format DDMMYYYY)

M2.7 SOWING DENSITY

M2.8 FERTILIZER APPLICATION

M2.9 GERMINATION IN THE FIELD [%]

M2.10 SEEDLING VIGOUR

Assessed 18 days after emergence

M2.11 NUMBER OF PLANTS ESTABLISHED

M2.12 NUMBER OF PLANTS POLLINATED

M2.13 POLLINATION METHOD

100 or more flowers are preferred

1 Selfing
2 Chain cross
3 Pair crossing
4 Bulk pollen
5 Isolation
6 Cluster bagging

M2.14 NUMBER OF POLLINATED SPIKES REPRESENTED IN STORE(S)

M2.15 AGRONOMIC EVALUATION

M2.16 PREVIOUS MULTIPLICATION AND/OR REGENERATION

M2.16.1 Location

M2.16.2 Sowing date

(in the format DDMMYYYY)

M2.16.3 Plot number

M2.17 OTHERS

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