

**DESCRIPTORS FOR**  
***SETARIA ITALICA***  
**AND *S. PUMILA***

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INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

DESCRIPTORS FOR SETARIA ITALICA AND S. PUMILA

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IBPGR Executive Secretariat  
Crop Genetic Resources Centre  
Plant Production and Protection Division  
Food and Agriculture Organization of the United Nations  
Via delle Terme di Caracalla, 00100 Rome, Italy

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## PREFACE

This descriptor list for foxtail millet (Setaria italica) and yellow foxtail (Setaria pumila) has been prepared by Prof. J. M. J. de Wet, of University of Illinois at Urbana - Champaign, USA in an IBPGR standard format following advice on descriptors and descriptor states from 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 resources 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 the 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 SETARIA ITALICA AND S. PUMILA

The 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 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 according to the SI system. The units to be applied are given in square brackets following the descriptor;
- (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 Section 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, 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);
- (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 by the curator when an accession is entered into his 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 occur 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; IS indicates an accession from the ICRISAT genebank)

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

1.5.6 Subrace



1.6 PEDIGREE/CULTIVAR NAME

Nomenclature and designations assigned to breeder's material

1.7 ACQUISITION DATE

The date in which the accession entered the collection

1.8 DATE OF LAST REGENERATION OR MULTIPLICATION

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

2.4 COUNTRY OF COLLECTION OR COUNTRY WHERE CULTIVAR/VARIETY BRED

Use the 3-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 [m]

Elevation above sea level

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 Breeder's 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? If so, provide any identification in the NOTES descriptor, 11

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 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

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

3.5 HARVEST DATE

3.6 FLOWERING DATE

Date when 50% of plants of an accession are in flower

4. PLANT DATA

4.1 VEGETATIVE

4.1.1 Growth habit

- 1 Erect
- 2 Erect geniculate
- 3 Decumbent
- 4 Prostrate

4.1.2 Plant height [cm]

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

4.1.3 Plant pigmentation

- 0 Not pigmented (green)
- 3 Pigmented
- 7 Deep purple

4.1.4 Number of basal tillers

Number of tillers at ground level or from the basal nodes

4.1.5 Culm branches

Number of culm branches on the main stem

4.1.6 Leaf colour

- 1 Green
- 2 Yellow
- 3 Pigmented
- 4 Deep purple

4.1.7 Blade length of flag leaf [mm]

Measured from ligule to tip

4.1.8 Blade width of flag leaf [mm]

Measured at widest point

4.1.9 Blade pubescence

- 1 Essentially glabrous
- 5 Medium pubescent
- 9 Strongly pubescent

4.1.10 Sheath length of flag leaf [mm]

Measured from internode to ligule

4.1.11 Sheath pubescence

- 1 Essentially glabrous
- 5 Medium pubescent
- 9 Strongly pubescent

4.1.12 Degree of lodging at maturity

- 1 Very slight
- 5 Medium
- 9 Extensive

4.1.13 Senescence

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

- 1 Actively growing
- 9 Dead

4.2 INFLORESCENCE AND FRUIT (See Figs. 1-6)

4.2.1 Length of peduncle [mm]

Measured from node to base of inflorescence

4.2.2 Peduncle exsertion [mm]

Measured from the exposed point of the peduncle from the leaf sheath up to base of the inflorescence

4.2.3 Length of inflorescence [mm]

Measured from lowest branch to tip of last branch of inflorescence

4.2.4 Inflorescence lobes

- 0 Absent
- 3 Short
- 7 Long
- 9 Large and thick

4.2.5 Inflorescence bristles

- 1 Very short
- 3 Short but obvious
- 5 Medium
- 7 Long
- 9 Carrying a spikelet

4.2.6 Bristle length [mm]

Measured at the middle of the inflorescence.  
At late dough stage

4.2.7 Inflorescence compactness

Lobes are arranged on the primary axis from  
loosely to very compactly

- 3 Loose
- 5 Medium
- 7 Compact
- 9 Spongy

4.2.8 Lobe compactness

- 3 Loose
- 5 Medium
- 7 Compact
- 9 Spongy

4.2.9 Inflorescence shape

- 1 Oblong
- 3 Ovate
- 5 Elliptic
- 7 Obovate

4.2.10 Colour of fruit

4.2.11 Length of fruit [mm]

4.2.12 Width of fruit [mm]

4.2.13 Days to flowering

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



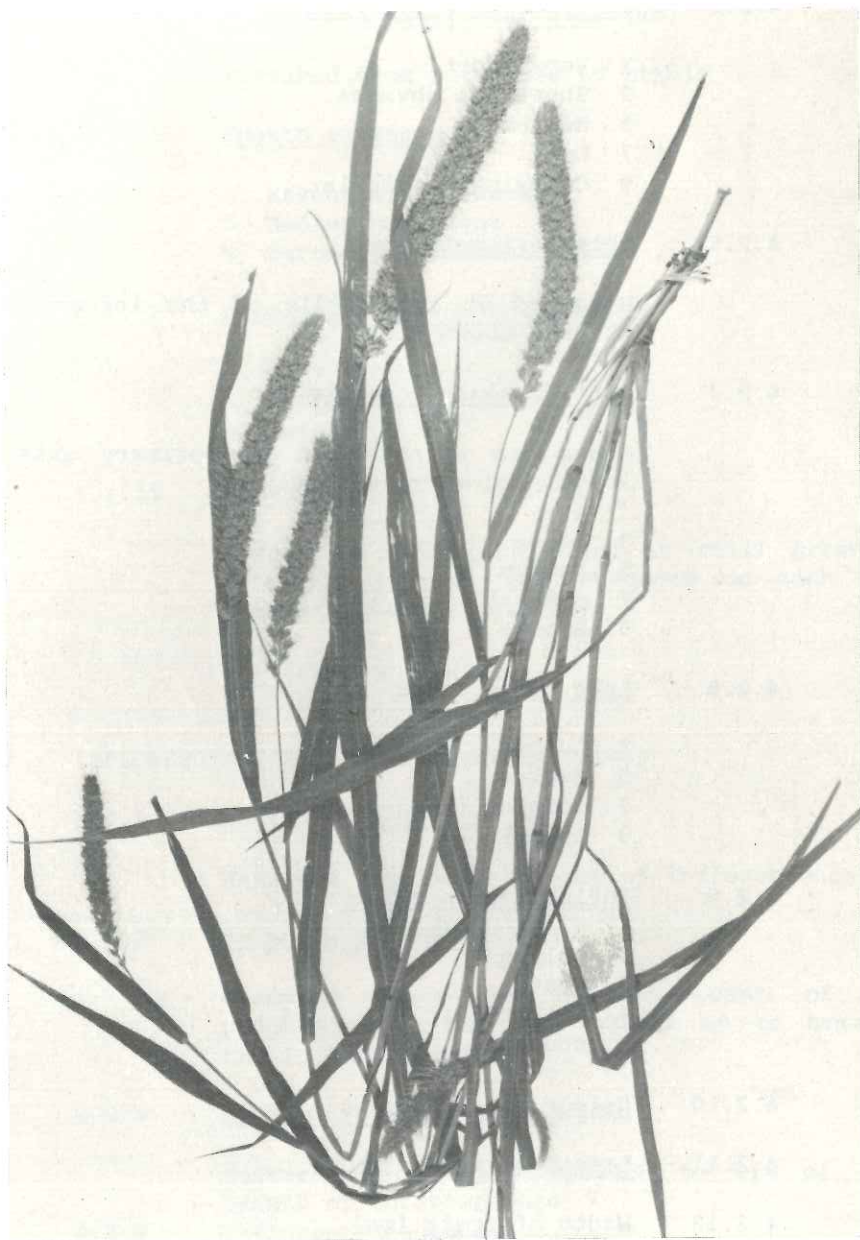


Fig. 1. Inflorescence cylindrical, lobes absent, bristles well developed (Setaria italica)



Fig. 2. Inflorescence pyramidal, lobes long and slender, loosely arranged on the primary axis, bristles medium well developed (Setaria italica)

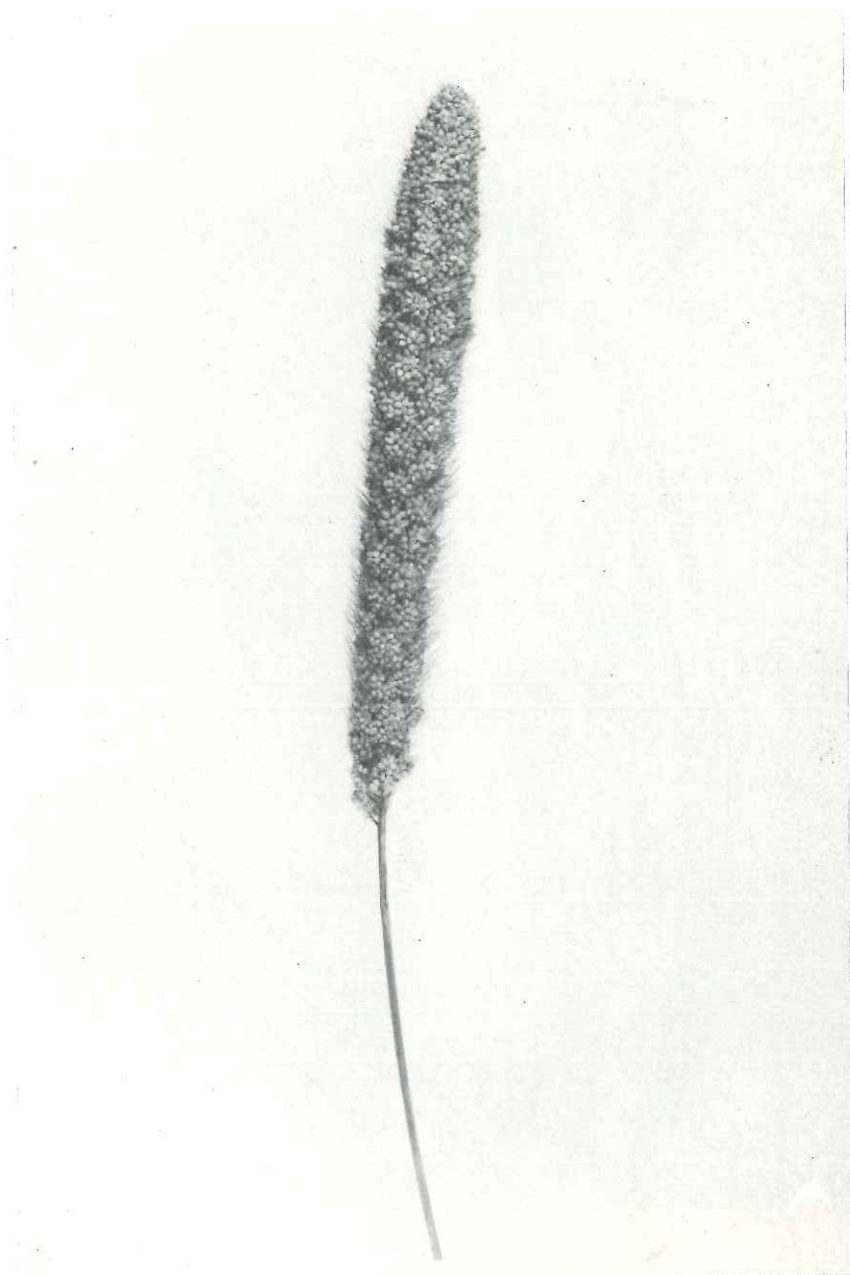


Fig. 3. Inflorescence cylindrical, lobes medium well developed, bristles well developed (Setaria italica)

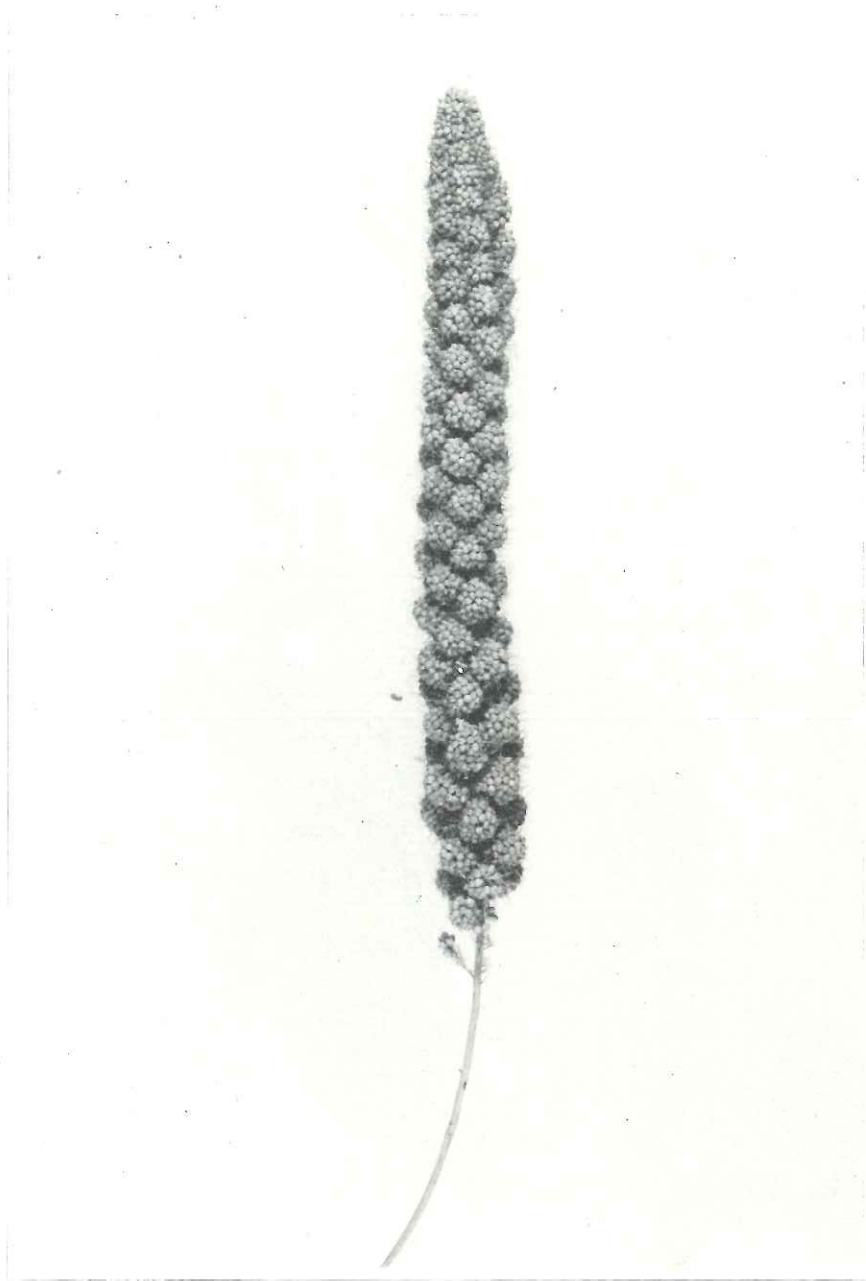


Fig. 4. Inflorescence cylindrical, lobes well developed, bristles medium well developed (Setaria italica)

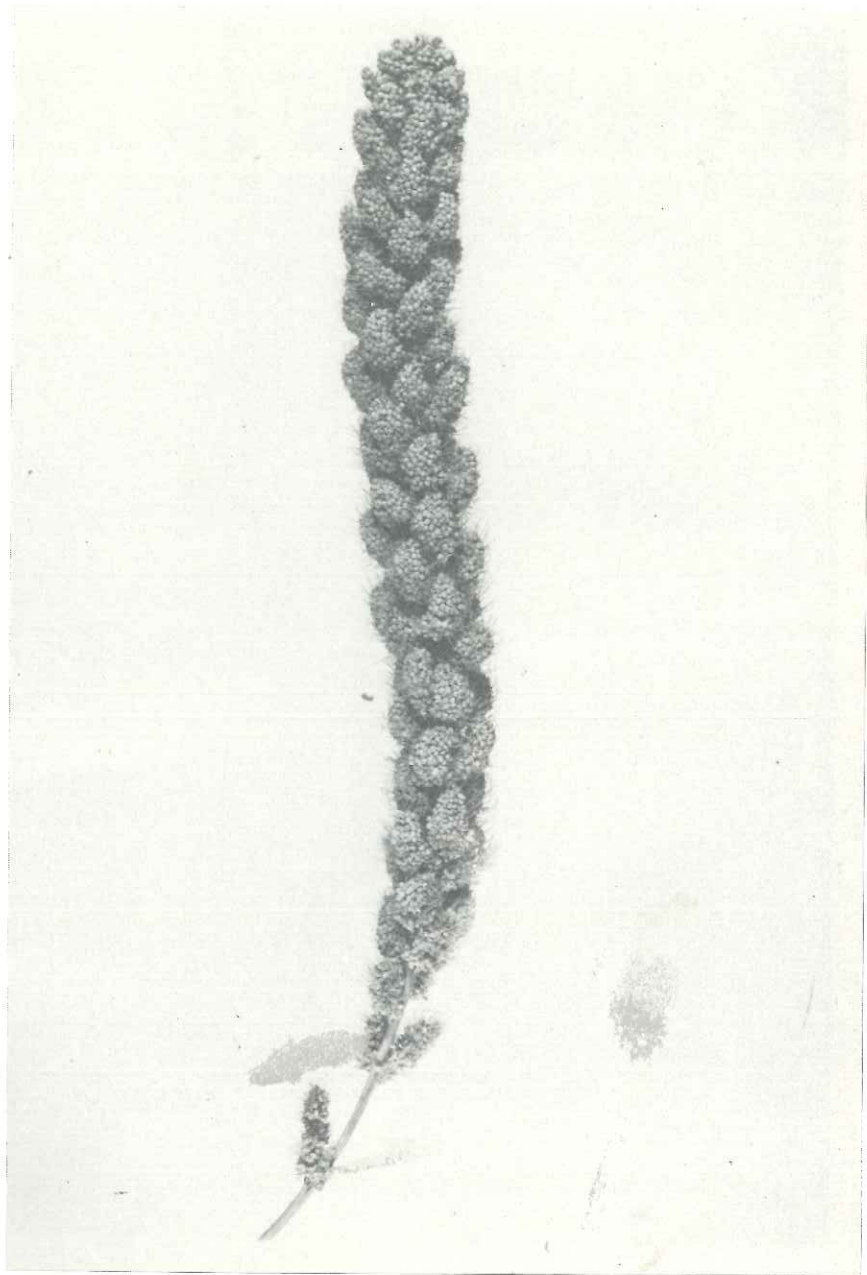


Fig. 5. Inflorescence cylindrical, lobes very well developed, bristles well developed (Setaria italica)

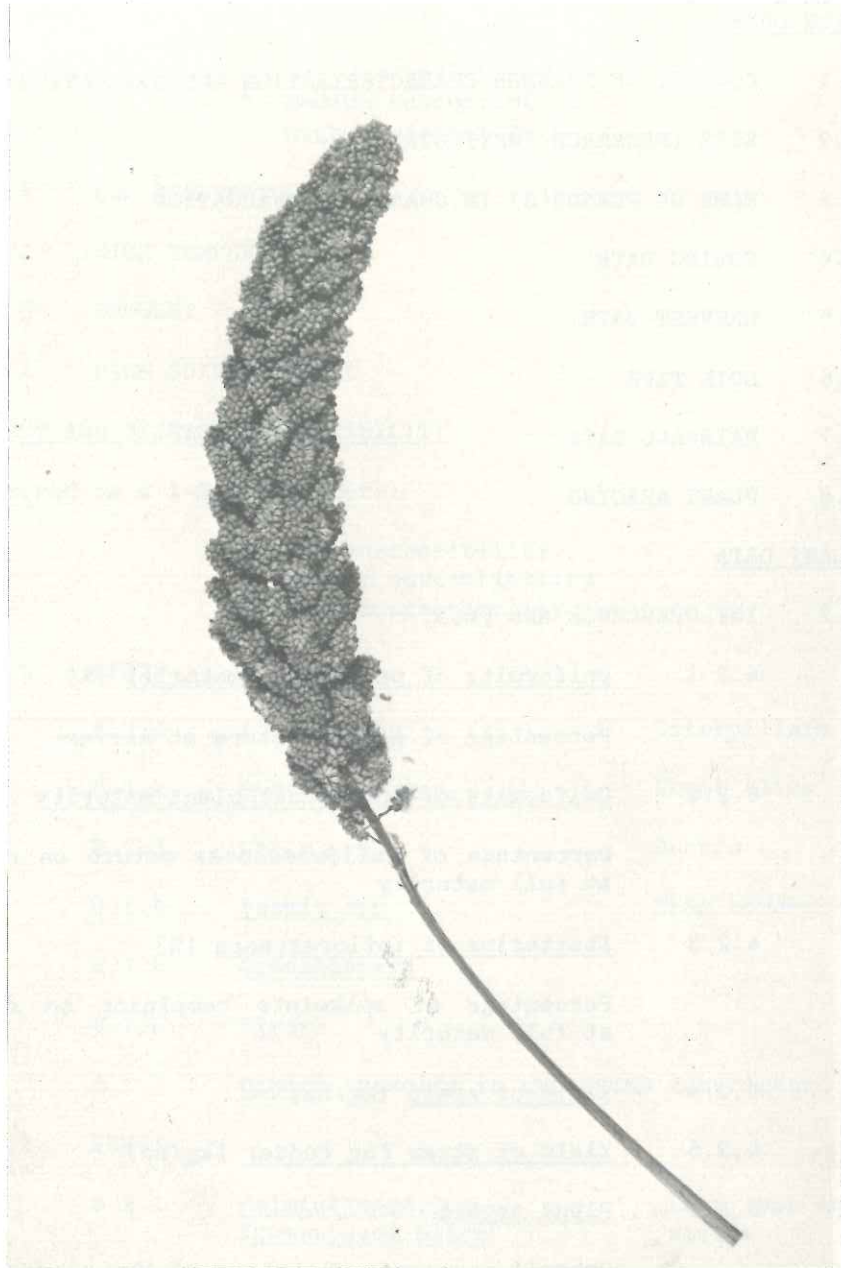


Fig. 6. Inflorescence pyramidal, lobes very well developed, bristles minute (Setaria italica)



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(S) IN CHARGE OF EVALUATION
- 5.4 SOWING DATE
- 5.5 HARVEST DATE
- 5.6 SOIL TYPE
- 5.7 RAINFALL DATA
- 5.8 PLANT SPACING

6. PLANT DATA

6.2 INFLORESCENCE AND FRUIT

6.2.1 Uniformity of population maturity [%]

Percentage of plants mature at harvest

6.2.2 Uniformity of individual plant maturity [%]

Percentage of inflorescences mature on racemes at full maturity

6.2.3 Shattering of inflorescence [%]

Percentage of spikelets remaining on racemes at full maturity

6.2.4 Yield of grain [kg/ha]

6.2.5 Yield of straw for fodder [kg/ha]

6.2.6 Plant aspect

Overall agronomic eliteness of the accession

- 1 Very poor
- 3 Poor
- 5 Average
- 7 Good
- 9 Very good

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 Amsacta spp. Caterpillars

8.1.2 Atherigona spp. Shoot flies

8.1.3 Chilo spp. Borers

8.1.4 Sesmia spp. Stem borers

8.1.5 Grasshoppers

8.1.6 Birds

8.1.7 Others (specify in the NOTES descriptor, 11)

8.2 FUNGI

8.2.1 Helminthosporium frumentacei Mitra Leaf spot and stripe

8.2.2 Helminthosporium Drechs Leaf spot/blight

8.2.3 Sorosporium (Tolyposporium) bullatum Schroet. Seed smut

- |       |  |             |
|-------|--|-------------|
| 8.2.4 | <u>Ustilago crus-galli</u><br><u>Tracy &amp; Earle</u> | Smut        |
| 8.2.5 | <u>Ustilago panici-frumentacei</u><br><u>Bref.</u>     | Smut        |
| 8.2.6 | <u>Ustilago paradoxa</u><br><u>Syd. &amp; Butler</u>   | Kernal smut |
| 8.2.7 | <u>Others</u> (specify in the NOTES descriptor, 11)    |             |

8.3 BACTERIA

8.4 VIRUS

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, 8.1.7, etc. Also include here any further relevant information