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INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

DESCRIPTORS FOR SOYABEAN

IBPGR SECRETARIAT
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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 is to promote and coordinate 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.

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PREFACE

This descriptor list has been prepared in an IBPGR standard format following advice on descriptors and descriptor states from crop experts. 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 modification will be welcomed by the IBPGR Secretariat, Rome.

REVISED DESCRIPTOR LIST FOR SOYABEAN

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 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 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 DATA

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).

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

etc.

1.5 SCIENTIFIC NAME

1.5.1 Genus

1.5.2 Species

1.6 PEDIGREE/CULTIVAR NAME

Nomenclature and designations assigned to breeder's material

1.6.1 Pedigree number

1.6.2 Cultivar name

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 or quantity in gm of accession in collection (if quantity is given specify 100 seed weight)

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 OR COLLECTION SITE

Number of km 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 meters

2.10 COLLECTION SOURCE

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

2.12 LOCAL/VERNACULAR NAME

Name given by farmer to cultivar/landrace/weed

2.13 NUMBER OF PLANTS SAMPLES

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

2.14 PHOTOGRAPH

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

- 0 No
- + Yes

2.15 OTHER NOTES FROM COLLECTOR

Collectors will record ecological information. For
cultivated soyabeans, cultural practices used 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 Stem determination

3 Determinate
5 Semi-determinate
7 Indeterminate

4.1.2 Number of leaflets

3 3
5 4-6
7 7 or more

4.1.3 Leaflet shape

Judged from the ratio of length/width of fully developed terminal leaflet on the middle part of main stems

3 Narrow (l/w 2.2 or more) = 'lanceolate'
5 Intermediate (l/w 1.9.2.1)
7 Broad (l/w 1.8 or less) = 'ovate'

4.1.4 Pubescence

0 Absent
+ Present

4.1.5 Pubescence density

3 Sparse
5 Semi-sparse
7 Normal
9 Dense

4.1.6 Pubescence colour

- 1 Grey
- 2 Light brown
- 3 Brown = 'tawny'

4.1.7 Pubescence type

- 1 Erect
- 2 Semi-appressed
- 3 Appressed
- 4 Curly
- 5 Retrorse tip

4.2 INFLORESCENCE

4.2.1 Corolla colour

- 3 White
- 5 Purple throat
- 7 Purple

4.2.2 Mature pod colour

- 3 Tan
- 5 Brown
- 7 Black

4.3 SEED

4.3.1 Seed coat colour

- 1 Yellowish white
- 2 Yellow
- 3 Green
- 4 Buff
- 5 Reddish brown
- 6 Grey
- 7 Imperfect black (black shading to buff)
- 8 Black

4.3.2 Seed coat pattern

- 1 Light hilum
- 2 Dark hilum
- 3 Saddle
- 4 Striped

4.3.3 Hilum colour

- 1 Yellow
- 2 Buff
- 3 Brown
- 4 Green
- 5 Grey
- 6 Imperfect black (= black with buff outer ring)
- 7 Black
- 8 Others (specify in the NOTES descriptor, 11)

4.3.4 Seed coat surface lustre

- 3 Shiny
- 5 Intermediate
- 7 Dull
- 9 Heavy bloom

4.3.5 Strophiole at the hilum

- 0 Absent
- + Present

4.3.6 100 seed weight

Absolute values in g normally measured at 13-15% moisture content

4.3.7 Cotyledon colour

- 1 Yellow
- 2 Green

FURTHER CHARACTERIZATION AND EVALUATION

5. SITE DATA

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 PLANTING PATTERNS

5.6.1 Row width

5.6.2 Spacing between hill

5.6.3 Number of plants/metre of row

5.6.4 Number of plants/m²

6. PLANT DATA

6.1 VEGETATIVE

6.1.1 Days to emergence

Number of days from planting to 50% seedling emergence

6.1.2 Seedling vigour

Assessed when the first trifoliolate leaf expanded

3 Poor
5 Medium
7 Vigorous

6.1.3 Hypocotyl colour

Recorded at the time when the primary leaves are expanded

1 Green
2 Purple

6.1.4 Leaflet size

Recorded with length (cm) x width (cm)

3 Small (70 cm² or less)
5 Medium (71 to 149 cm²)
7 Large (150 cm² and more)

6.1.5 Petiole presence

0 Absent
+ Present

6.1.6 Plant height at R1

Actual measurement in cm as means of 20 randomly selected plants

6.1.7 Number of nodes on the main stem at flowering $\frac{1}{2}$ (R₁)

Note as in 6.1.8

6.1.8 Number of nodes on the main stem at maturity (R₈)

Details to be worked out at each centre. May be relative to a standard check variety (specify in the NOTES descriptor 11.)

6.1.9 Plant height at R₈

Actual measurement in cm as mean of 20 randomly selected plants

6.1.10 Number of primary branches (when at least 2 nodes) per plant at maturity

Mean of 20 randomly selected plants

6.1.11 Lodging score

Scored from leaning angle and lodging area (see Table 1)

0 None
3 Slight
5 Moderate
7 Severe
9 Very severe

Table 1. Leaning angle and lodging area

Lodging area	0-9°	10-19°	20-29°	40-49°	60°
0-19%	1	1	1	1	1
20-39%	1	1	3	3	5
40-59%	1	3	3	5	7
60-79%	1	3	5	7	9
80%	3	3	5	7	9

6.1.12 Nodulation with natural inoculation

- 0 None
- 3 Poor
- 7 Heavy

6.1.13 Maturity time

- 1 Earliest (US/Canadian groups^{1/}
000,00 0)
- 3 (I, II)
- 5 (III, IV)
- 7 (V, VI, VII)
- 9 Latest (VIII, XI, X)

6.2 INFLORESCENCE AND FRUIT

6.2.1 Photoperiod sensitivity score

- 0 Insensitive
- 9 Most sensitive

6.2.2 Days to flowering

Number of days from planting to 50% of plants with at least one open flower (growth stage R₁)

6.2.3 Shattering score

Estimated percent of pod splitting and seed shattering at a comparable time after maturity to be specified in the NOTES descriptor, 11. (Reference varieties can be included.)

- 1 No shattering
- 2 Slight shattering
- 5 Medium shattering
- 7 Shattering
- 9 Highly shattering

6.3 SEED

6.3.1 Grain yield

Yield (kg) per ha adjusted to 13% moisture

6.3.2 Seed quality

Assessed by the degree of shrivelled, physiologically cracked, discoloured, injured seed and uniformity of seed size

- 3 Poor
- 5 Medium
- 7 Good

6.3.3 Number of seeds per pod

Mean of 50 randomly selected pods

6.3.4 Hard seeds

Actual percent

6.3.5 Total oil content

Percent on dry seed weight basis

6.3.6 Fatty acid composition

Percent dry seed weight basis

- 6.3.6.1 Palmitic
- 6.3.6.2 Stearic
- 6.3.6.3 Oleic
- 6.3.6.4 Linoleic
- 6.3.6.5 Linolenic

6.3.7 Protein content (6.25 x N)
Percent on dry seed weight basis

6.3.8 Sulphur containing Amino Acids
g/100 g protein

6.3.8.1 Methionine

6.3.8.2 Cystine

6.3.8.3 Cystonine

6.3.9 Proportion of 11S Globulin to 7S Globulin

6.3.10 Storability of seeds

Actual percentage of good seed after 6 weeks
storage at 40°C and 75% RH

7. STRESS REACTIONS

Standards to be developed for

- 7.1 LOW TEMPERATURE
- 7.2 HIGH TEMPERATURE
- 7.3 DROUGHT
- 7.4 HIGH SOIL MOISTURE
- 7.5 SOIL SALINITY
- 7.6 SOIL ACIDITY

8. PEST AND DISEASE SUSCEPTIBILITY

Each based on a 1-9 scale where

- 0 "Immune"
- 3 Low susceptibility
- 5 Medium susceptibility
- 7 High susceptibility

8.1 PESTS

8.1.1 Ophiomyia phaseoli Tryon (Beanfly)

8.1.2 Melangromyza sojae Zehnt (Stem minor)

- 8.1.3 Ophiomyia centrosematis de Meij (Root minor)
- 8.1.4 Leguminivora glycinivorella Matsumura
(Soyabean pod borer)
- 8.1.5 Heliothis virescens F. (Tobacco budworm)
- 8.1.6 Nezara viridula L. (Green sting bug)
- 8.1.7 Riptortus clavatus Thunberg and others
(Sting bugs)
- 8.1.8 Aphis craccivora Koch (Groundnut aphid)
- 8.1.9 Aulocorthus pelargonii Rolt (Soyabean aphid)
- 8.1.10 Tetranychus truncatus Ehara L. (Spider mite)
- 8.1.11 Other spider mites (specify in the NOTES
descriptor, 11)
- 8.1.12 Epilachna varivestis Mulsant (Mexican bean
beetle)
- 8.1.13 Pseudoplusia includens (Soyabean looper)
- 8.1.14 Empoasca fabae Harr. (Leaf hopper, Jassid)
- 8.1.15 Other lead hoppers (specify in the NOTES
descriptor, 11)
- 8.1.16 Matsumuraeses talcana Walsingham and others
(Soyabean podworm complex)
- 8.1.17 Asphondylia sp. (Soyabean pod gall midge)
- 8.1.18 Anticarsia gemmatalis Hub. (Velvet bean
caterpillar)
- 8.1.19 Bemisia tabaci Genn. (White fly)
- 8.1.20 Cerotoma sp. (Bean leaf beetle)
- 8.1.21 Spodoptera exigua Hub. (Beet armyworm)
- 8.1.22 Heterodera glycines Ichinohe (Soyabean cyst
nematode)
- 8.1.23 Meloidogyne incognita (Kofoid and Wood)
Chitwood (Root-knot nematode)

- 8.1.24 Other nematodes (specify in the NOTES descriptor, 11)
- 8.2 FUNGI
- 8.2.1 Cercospora kikuchi T. Masu & Tomoyasu.
Gardner (Purple seed stain)
Mottling and staining ratings to be given
- 8.2.2 C. sojina Hara (Forg eye leaf spot)
- 8.2.3 Colletotrichum dematium (Pers. ex Fr.)
Grove var.
- 8.2.4 Cornespora sp. (Target spot)
- 8.2.5 Elsinoë glycines Jenkins (Sphaceloma scab)
- 8.2.6 Macrophomina phaseolina (Tassi) Goid.
(Charcoal rot)
- 8.2.7 Peronospora manshurica (Aoum.) Syd. ex Gaum
(Downy mildew)
- 8.2.8 Phakopsora pachyrhizi Sydow (Soyabean rust)
- 8.2.9 Phialophora gregata (All. & Chambert) W. Gams.
(Brown stem rot)
- 8.2.10 Phomopsis sojae Lehman and Diaporthe phaseolorum [(Cke & Ell.) Sacc. Var. Sojae [(Lehman) Wehm.]
(Phomopsis seed decay)
- 8.2.11 Phytophthora megasperma (Drechs) var. sojae,
A.A. Hildebrand (Phytophthora root rot)
- 8.2.12 Rhizoctonia solani Kuehn (Rhizoctonia acrial foliage and web blight)
- 8.3 BACTERIA
- 8.3.1 Pseudomonas syringae pv. glycinea (Coerper)
Young
- 8.3.2 Xanthomonas campestris pv. phaseoli (Smith)
Dye. (Bacterial pustule)
- 8.4 VIRUS
- 8.4.1 Soyabean mosaic virus

8.4.2 Soyabean yellow mosaic virus

8.4.3 Soyabean dwarf mosaic virus

8.4.4 Soyabean stunt virus

9. BIOLOGICAL CHARACTERS

9.1 ISOZYMES

10. CYTOLOGICAL CHARACTERS AND IDENTIFIED GENES

10.1 CYTOLOGICAL CHARACTERS

10.2 IDENTIFIED GENES

11. NOTES

Give additional information where descriptor state is noted as 'other' as for example in descriptor 2.10, 4.3.3 etc.

Also include here any further relevant information.