DESCRIPTORS FOR GROUNDNUT

IBPGR ICRISAT

DESCRIPTORS FOR GROUNDNUT

IBPGR \ICRISAT ROME 1992

El Consejo Internacional de Recursos Fitogenéticos (IBPGR) es una organización científica internacional autónoma bajo los auspicios del CGIAR. La función básica del IBPGR es promover y coordinar una red internacional de centros de recursos genéticos para la recolección, conservación, documentación, evaluación y utilización de recursos fitogenéticos y, en consecuencia contribuir a elevar el nivel de vida y el bienestar de la población de todo el mundo. Prestan apoyo financiero al programa básico los Gobiernos de Alemania, Australia, Austria, Bélgica, Canadá, China, Dinamarca, España, Estados Unidos, Francia, India, Italia, Japón, Noruega, Países Bajos, Reino Unido, Suecia y Suiza, así como el UNEP y el Banco Mundial

El Instituto Internacional de Investigación para Zonas Tropicales Semiáridas (ICRISAT) es un instituto científico de investigación y de capacitación no lucrativo, financiado por los donantes a través del CGIAR. Los donantes del ICRISAT son los Gobiernos o agencias gubernamentales de Alemania, Australia, Bélgica, Canadá, China, Estados Unidos, Finlandia, Francia, India, Italia, Japón, Noruega, Países Bajos, Reino Unido, Suecia y Suiza, así como las siguientes organizaciones internacionales y privadas: Banco Africano de Desarrollo, Banco Asiático de Desarrollo, Banco Mundial, Centro Internacional de Investigaciones para el Desarrollo, Centro Internacional de Promoción de los Fertilizantes, Consejo Internacional de Recursos Fitogenéticos, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Fondo Internacional de Desarrollo Agrícola, Comunidad Económica Europea, Fondo de la OPEC para el Desarrollo Internacional, Fundación Rockefeller, Programa de las Naciones Unidas para el desarrollo, Universidad de Georgia y Universidad de Hohenheim. Las informaciones y conclusiones contenidas en ésta publicación no reflejan necesariamente la posición de los gobiernos, agencias y de los organismos internacionales y privados arriba mencionados

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 basic function of 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. Financial support for the core programme is provided by the Governments of Australia, Austria, Belgium, Canada, China, Denmark, France, Germany, India, Italy, Japan, the Netherlands, Norway, Spain, Sweden, Switzerland, the UK and the USA, as well as the United Nations Environment Programme and the World Bank

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a nonprofit, scientific, research and training institute receiving support from donors through the CGIAR. Donors to ICRISAT include governments and agencies of Australia, Belgium, Canada, China, Finland, France, Germany, India, Italy, Japan, Netherlands, Norway, Sweden, Switzerland, United Kingdom, United States of America, and the following international and private organizations: African Development Bank, Asian Development Bank, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), International Board for Plant Genetic Resources, International Development Research Centre, International Fertilizer Development Center, International Fund for Agricultural Development, The European Economic Community, The Opec Fund for International Development, The Rockefeller Foundation, The World Bank, United Nations Development Programme, University of Georgia and University of Hohenheim. Information and conclusions in this publication do not necessarily reflect the position of the aforementioned governments, agencies, and international and private organizations

Le Conseil International des Ressources Phytogénétiques (IBPGR) est une organisation scientifique autonome internationale placée sous l'égide du CGIAR. La fonction de base de l'IBPGR est de promouvoir et de coordonner un réseau international des centres de ressources génétiques pour la mise en valeur de la collecte, la conservation, la documentation, l'évaluation et l'utilisation de germoplasme végétal, élever dans plantes et ainsi contribuer à augmenter le niveau de vie et le bien-être des peuples à travers le monde. Le support financier aux programmes est fourni par les gouvernements de l'Allemagne, l'Australie, l'Autriche, la Belgique, le Canada, la Chine, le Danemark, l'Espagne, les Etats-Unis, la France, l'Inde, l'Italie, le Japon, les Pays-Bas, la Norvège, le Royaume-Uni, la Suède et la Suisse, aussi bien que le Programme des Nations Unies pour l'Environnement et la Banque Mondiale

L'Institut international de recherche sur les cultures des zones tropicales semi-arides (ICRISAT) est un institut de recherche et de formation, à but non lucratif, financé par de nombreux donateurs regroupés au sein du CGIAR. Les donateurs de l'ICRISAT sont les gouvernements ou agences gouvernementales d'Allemagne, Australie, Belgique, Canada, Chine, Etats-Unis, Finlande, France, Inde, Italie, Japon, Norvège, Pays-Bas, Royaume-Uni, Suède et Suisse, ainsi que les organismes internationaux et privés suivants: Banque africaine de développement, Banque asiatique de développement, Banque mondiale, Centre international pour le développement des engrais, Centre de recherche pour le développement international, Communauté économique européenne, Conseil international des ressources phytogénétiques, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Fondation Rockefeller, Fonds de l'OPEP pour le développement international, Fonds international pour le développement agricole, Programme des Nations Unies pour le développement, Université de Georgia et Université de Hohenheim. Les informations et les conclusions contenues dans cette publication ne reflètent pas forcément la position des gouvernements, des agences et des organismes internationaux et privés précités

Citation

IBPGR and ICRISAT. 1992. *Descriptors for groundnut.* International Board for Plant Genetic Resources, Rome, Italy; International Crops Research Institute for the Semi-Arid Tropics, Patancheru, India

ISBN 92-9043-139-3

IBPGR
Via delle Sette Chiese 142
00145 Rome
Italy

ICRISAT
Patancheru
Andhra Pradesh 502 324
India

Printed at ICRISAT, Patancheru, India

CONTENTS

PREFACE

Descriptors for groundnut (*Arachis hypogaea* L.) is a revision of the original IBPGR and ICRISAT publication *Groundnut Descriptors* (1981) and *Groundnut Descriptors* (revised) (1985). The 1981 list, developed at a joint IBPGR-ICRISAT Working Group meeting in 1980, was reprinted in 1985 in the IBPGR internationally accepted format for descriptor lists. The descriptors in the present list are cross-referenced with the 1981 descriptors. The 1981 list numbers for similar descriptors are given in parentheses beside the present descriptors.

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. 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 format by any user. An additional category of management descriptors is intended for curators of germplasm collections as guidelines for management of accessions in medium- and long-term storage as well as for 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. 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 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 for a 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 (1.1)

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 from the genebank at Bari, Italy, PI indicates an accession within the USA system)

1.2 DONOR NAME (2.6)

Name of institution or individual responsible for donating the germplasm

1.3 DONOR NUMBER (1.2)

Number assigned to accession by the donor

1.4 OTHER NUMBER(S) ASSOCIATED WITH THE ACCESSION (1.4-1.6)

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 (1.7)

1.5.2 Section

1.5.3 Series

1.5.4 Species (1.8)

1.5.5 Author(s)

1.5.6 Subspecies (1.9)

1.5.7 Botanical variety (1.10)

1.6 PEDIGREE (1.12)

Parentage, or nomenclature and designations assigned to breeders' material

1.7 CULTIVAR NAME (1.11)

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 or pods 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

2. COLLECTION DATA

2.1 COLLECTING INSTITUTE(S) (2.1)

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

2.2 COLLECTOR'S NUMBER (2.2-2.3)

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. It should be unique and always accompany subsamples wherever they are sent

2.3 COLLECTION DATE OF ORIGINAL SAMPLE (2.4)

(in the format DDMMYYYY)

2.4 COUNTRY OF COLLECTION (2.7)

Name of the country in which the sample was collected or was bred. Use three letter abbreviations adopted by the Statistical Office of the United Nations. Copies of these are available from IBPGR Headquarters and have been published in the FAO/IBPGR *Plant Genetic Resources Newsletter*, number 49 (March, 1982)

2.5 PROVINCE/STATE (2.8)

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 (2.9)

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 (2.10)

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

2.9 LONGITUDE OF COLLECTION SITE (2.11)

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

2.10 ELEVATION OF COLLECTION SITE [m] (2.12)

Altitude above sea level

2.11 COLLECTION SOURCE (2.5)

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 (2.14)

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 (2.13)

2.14 NUMBER OF PODS COLLECTED

2.15 WEIGHT OF SEED COLLECTED [g]

2.16 CULTURAL PRACTICES (2.18)

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 (2.19)

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
7 High

2.19 LOCAL/VERNACULAR NAME (2.15)

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

2.20 ETHNIC GROUP (2.16)

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 Oil
4 Edible nuts (specify if cooked or raw)
5 Sauce
6 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

2.22 USES OF THE HAULMS

1 Green fodder
2 Dried fodder
3 Other (specify in the descriptor COLLECTOR'S NOTES, 2.29)

2.23 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

2.24 COLLECTION SOURCE ENVIRONMENT (2.18)

2.24.1 Growing period (state months)

2.24.2 Maturity

2.24.3 Vigour

2.24.4 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)

2.24.5 Soil fertility

3 Poor
7 Good

2.24.6 Soil *p*H

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

2.24.7 Soil moisture

3 Low
7 High

2.24.8 Soil texture

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

2.24.9 Soil drainage

3 Poor
7 Good

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

2.25 CLIMATE OF COLLECTION SITE

2.25.1 Temperature range [°C]

2.25.2 Rainfall range [mm]

2.25.3 Wind [km s^{-1}]

2.25.4 Frost

Number of frost-free days during growing season

2.25.5 Light

3 Shady
7 Sunny

2.26 HERBARIUM SPECIMEN

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

0 No
+ Yes

2.27 ASSOCIATED CROPS

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

2.28 PREVAILING STRESSES

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

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) (3.1)

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 (3.2)

3.4 SOWING DATE (3.3)

(in the format DDMMYYYY)

3.5 HARVEST DATE (3.4)

(in the format DDMMYYYY)

3.6 EVALUATION ENVIRONMENT

Environment in which characterization/preliminary evaluation was carried out

1 Field (specify in the descriptor NOTES, 3.19)
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% FIELD EMERGENCE (5.1.1)

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 GROSS MORPHOLOGY

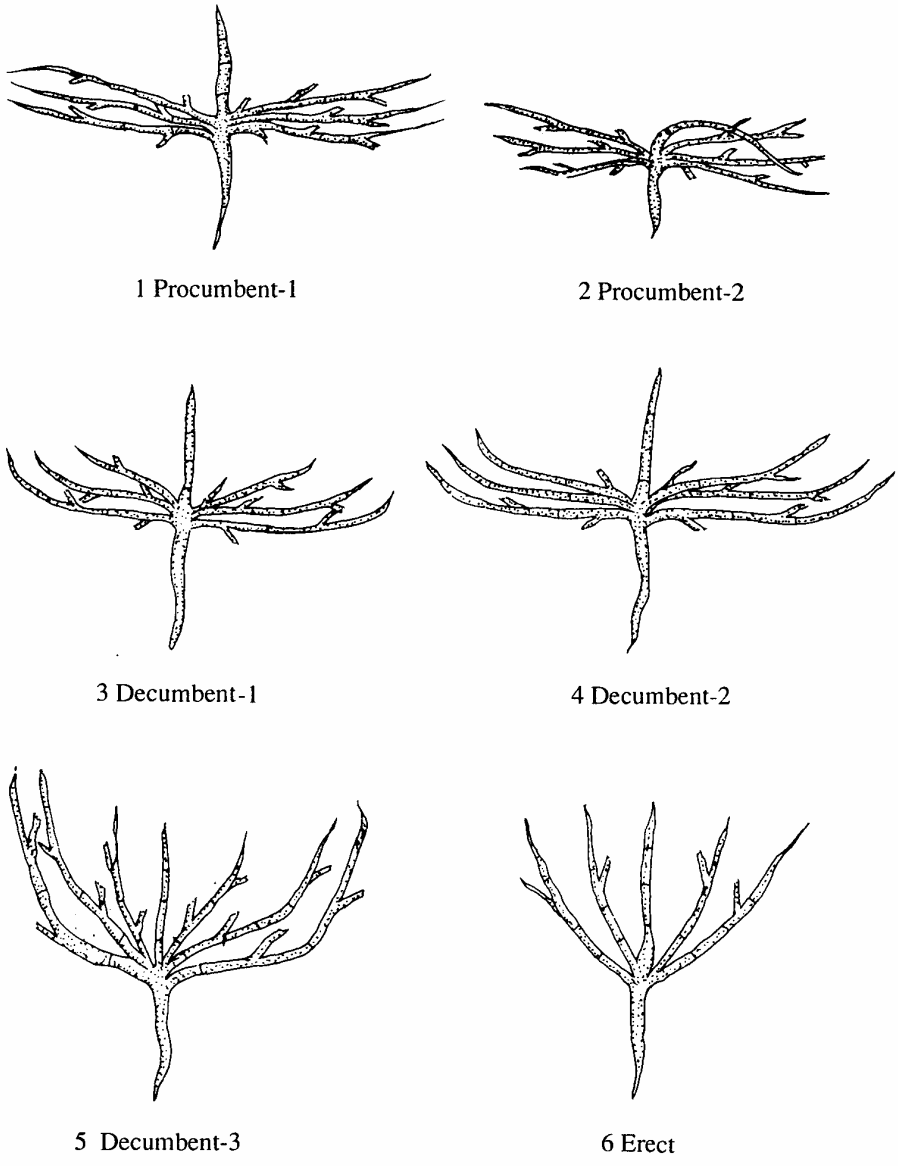
4.1.1 Life form (4.1.1)

1 Annual
2 Perennial
3 Unknown

4.1.2 Growth habit (4.1.2)

Recorded at podding stage for plants at 10-15 cm interplant spacing. (See Fig. 1)

1 Procumbent-1
2 Procumbent-2
3 Decumbent-1
4 Decumbent-2
5 Decumbent-3
6 Erect
7 Other (specify in the descriptor NOTES, 4.8)



1 Procumbent-1

2 Procumbent-2

3 Decumbent-1

4 Decumbent-2

5 Decumbent-3

6 Erect

Fig. 1. Growth habit

4.2 STEM

4.2.1 Branching pattern (4.2.1)

Determined on (n+1) cotyledonary lateral branches. (See Fig. 2)

1 Alternate
2 Sequential
3 Irregular with flowers on main stem
4 Irregular without flowers on main stem
5 Other (specify in the descriptor NOTES, 4.8)

4.2.2 Number of branches

4.2.2.1 Primary (n+1)

4.2.2.2 Secondary (n+2)

4.2.2.3 Tertiary

4.2.3 Height of main stem [cm]

Measured from cotyledonary axil up to terminal bud, mean of 10 plants, recorded 60-85 days after emergence

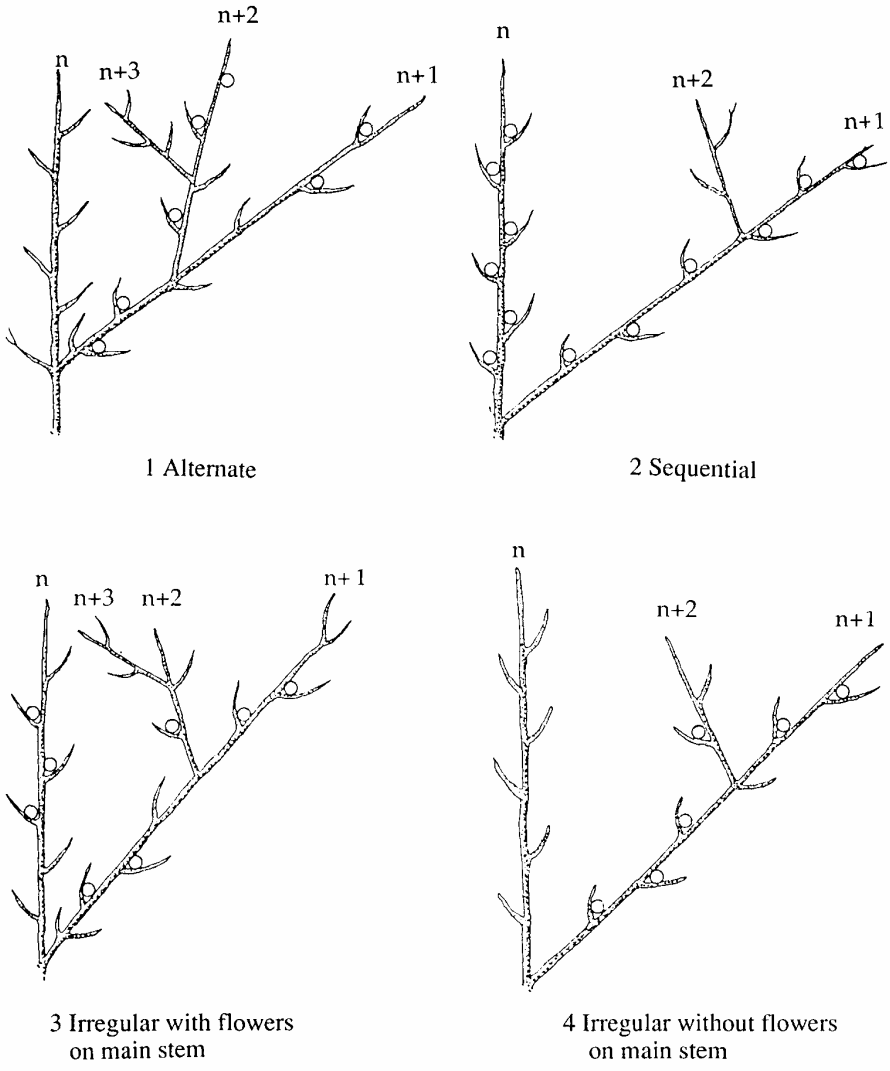
4.2.4 Plant width or spread [cm]

Measured at the widest point, from branch tip to tip, mean of 10 plants, recorded 45-60 days after emergence

4.2.5 Stem pigmentation (4.2.2)

Recorded on mature plants

0 Absent
+ Present



0 = Reproductive branch

Fig. 2. Branching pattern

4.2.6 Stem surface (4.2.3)

Observed on the main axis

1 Glabrous
3 Sub-glabrous, hairs in one or two rows along the main stem
5 Moderately hairy, three or four rows along the main stem
7 Very hairy, most of the stem surface covered with hairs
9 Woolly (as in 7 but with long hairs)

4.3 INFLORESCENCE AND FLOWER

4.3.1 Type of inflorescence

1 Simple
2 Compound (number of flowers per axil)

4.3.2 Standard petal colour (4.4.1)

Colour of front face of the standard petal of fresh, fully opened flowers. Royal Horticultural Society (RHS) colour codes are given in parentheses beside descriptor states

1 White (orange-white group 159D)
2 Lemon yellow (yellow group 6C)
3 Yellow (yellow group 9B)
4 Orange-yellow/yellow-orange (orange group 25B)
5 Orange (orange group 24A)
6 Dark orange (orange group 28A)
7 Garnet/brick red (red group 53A)
8 Other (specify in the descriptor NOTES, 4.8)

4.3.3 Colour of standard petal markings (4.4.2)

Colour of the markings (crescent) on the front face of the standard petal. (RHS colour codes are given in parentheses beside descriptor states)

1 White (orange-white group 159D)
2 Lemon yellow (yellow group 6C)
3 Yellow (yellow group 9B)
4 Orange-yellow/yellow-orange (orange group 25B)
5 Orange (orange group 24A)
6 Dark orange (orange group 28A)
7 Garnet/brick red (red group 53A)
8 Other (specify in the descriptor NOTES, 4.8)

4.3.4 Peg pigmentation (4.3.3)

0 Absent
+ Present

4.4 LEAF

4.4.1 Leaf colour (4.5.1)

Colour of fully expanded leaf. (RHS colour codes are given in parentheses beside descriptor states)

1 Yellow/yellow-green (yellow-green group 153D)
2 Light green (yellow-green group 146A)
3 Green (yellow-green group 147A)
4 Dark green (green group 137A)
5 Bluish green (green group 126A)
6 Other (specify in the descriptor NOTES, 4.8)

4.4.2 Leaflet length [mm] (4.5.2)

Measured on the third leaf, apical leaflet, of the main stem when fully expanded, mean of 10 leaflets from different plants

4.4.3 Leaflet width [mm] (4.5.3)

Measured on the third leaf, fully expanded apical leaflet, of the main stem, at its widest point, mean of 10 leaflets from different plants

4.4.4 Leaflet shape (4.5.5)

Shape of fully expanded, apical leaflet of the third leaf on the main stem (See Fig. 3)

1 Cuneate
2 Obcuneate
3 Elliptic
4 Oblong-elliptic
5 Narrow-elliptic
6 Wide-elliptic
7 Suborbicular
8 Orbicular
9 Ovate
10 Obovate
11 Oblong
12 Oblong-lanceolate
13 Lanceolate
14 Linear-lanceolate
15 Other (specify in the descriptor NOTES, 4.8)

4.4.5 Leaflet surface (4.5.6)

Recorded from leaflets at the third node, use both surfaces

1 Almost glabrous on both surfaces
2 Almost glabrous above, hairs below
3 Almost glabrous above, hairs and/or bristles below
4 Almost glabrous below, hairs above
5 Almost glabrous below, hairs and bristles above
6 Hairs on both surfaces, without bristles
7 Hairs on both surfaces, with bristles at least on one surface
8 Woolly without bristles
9 Woolly with bristles at least on one surface
10 Other (specify in the descriptor NOTES, 4.8)

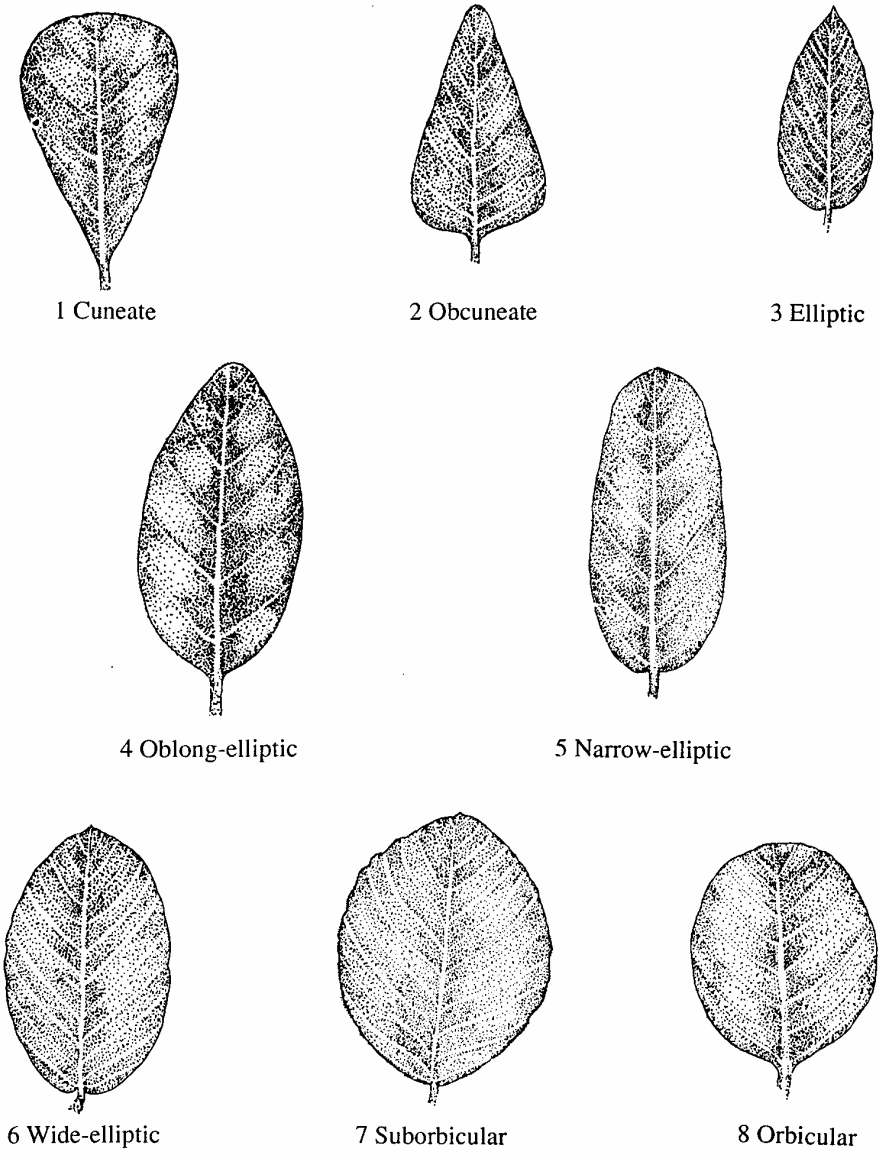
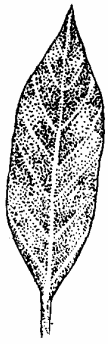


Fig. 3. Leaflet shape

9 Ovate

10 Obovate

11 Oblong



12 Oblong-lanceolate

13 Lanceolate

14 Linear-lanceolate

Fig. 3. Leaflet shape (continued)

4.4.6 Leaflet margin

1 Entire
2 Hairy
3 Wavy
4 Other (specify in the descriptor NOTES, 4.8)

4.4.7 Leaflet tip

1 Obtuse
2 Acute
3 Mucronate
4 Other (specify in the descriptor NOTES, 4.8)

4.5 FRUIT

4.5.1 Number of seeds per pod (4.6.1)

1 2-1
2 2-3-1/2-1-3
3 3-2-1/3-1-2
4 2-3-4-1/2-4-3-1/2-3-1-4/2-4-1-3/2-1-3-4/2-1-4-3-5/3-2-4-1/3-2-1-4
6 3-4-2-1/3-4-1-2
7 4-3-2-1/4-2-3-1
8 4-3-1-2/4-2-1-3
9 3- or 4-seeded with occasional 5-seeded pods
10 Other (specify in the descriptor NOTES, 4.8)

4.5.2 Pod beak (4.6.2)

(See Fig. 4)

0 Absent
3 Slight
5 Moderate
7 Prominent
9 Very prominent

4.5.3 Pod constriction (4.6.3)

(See Fig. 5)

0 None
3 Slight
5 Moderate
7 Deep
9 Very deep

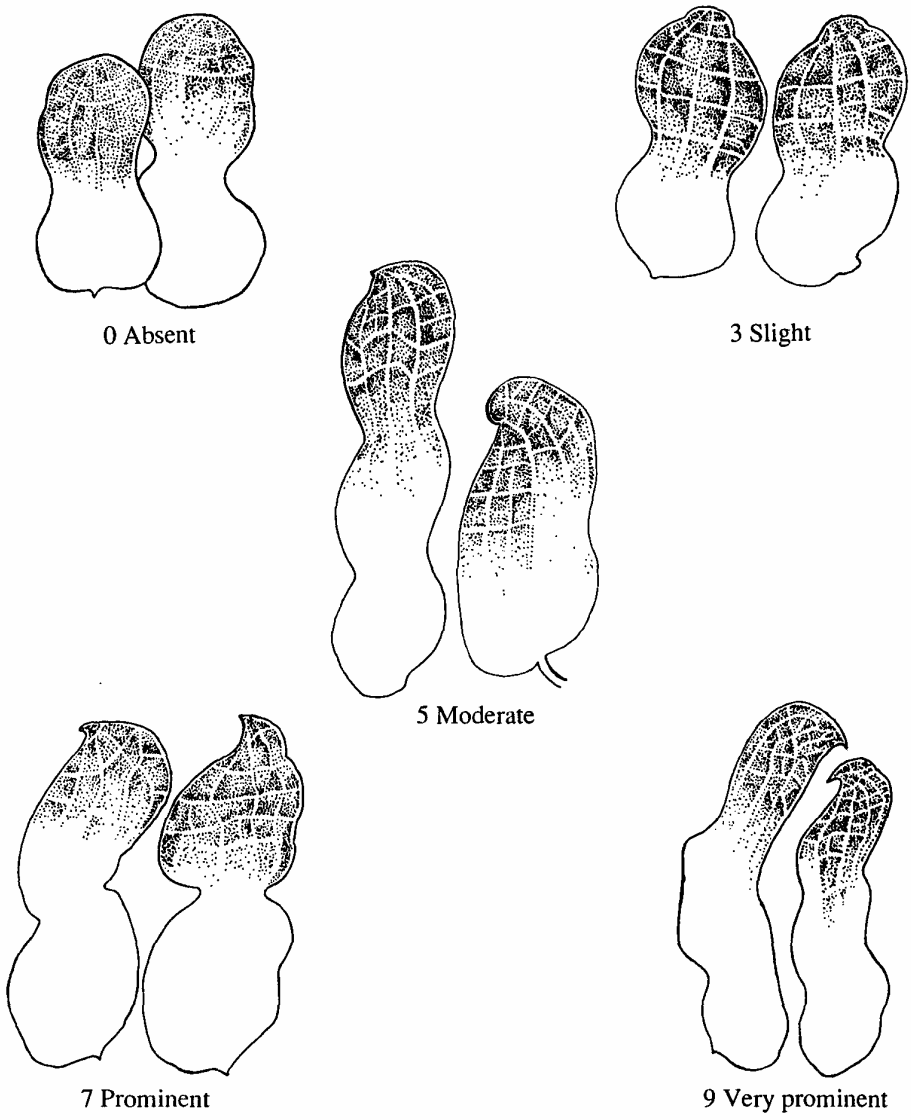
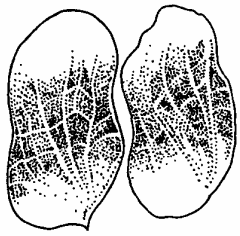
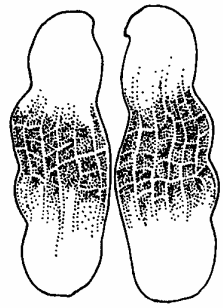


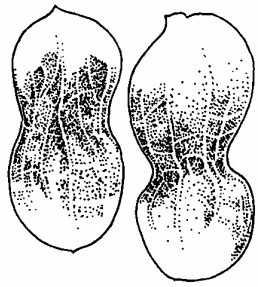
Fig. 4. Pod beak



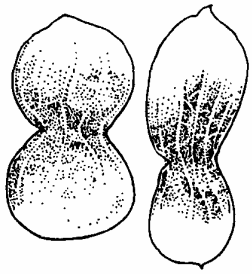
0 None



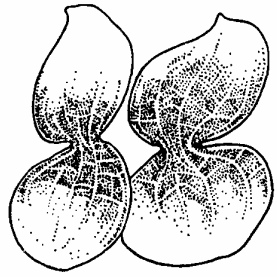
3 Slight



5 Moderate



7 Deep



9 Very deep

Fig. 5. Pod constriction

4.5.4 Pod reticulation (4.6.4)

(See Fig. 6)

0 None
3 Slight
5 Moderate
7 Prominent
9 Very prominent

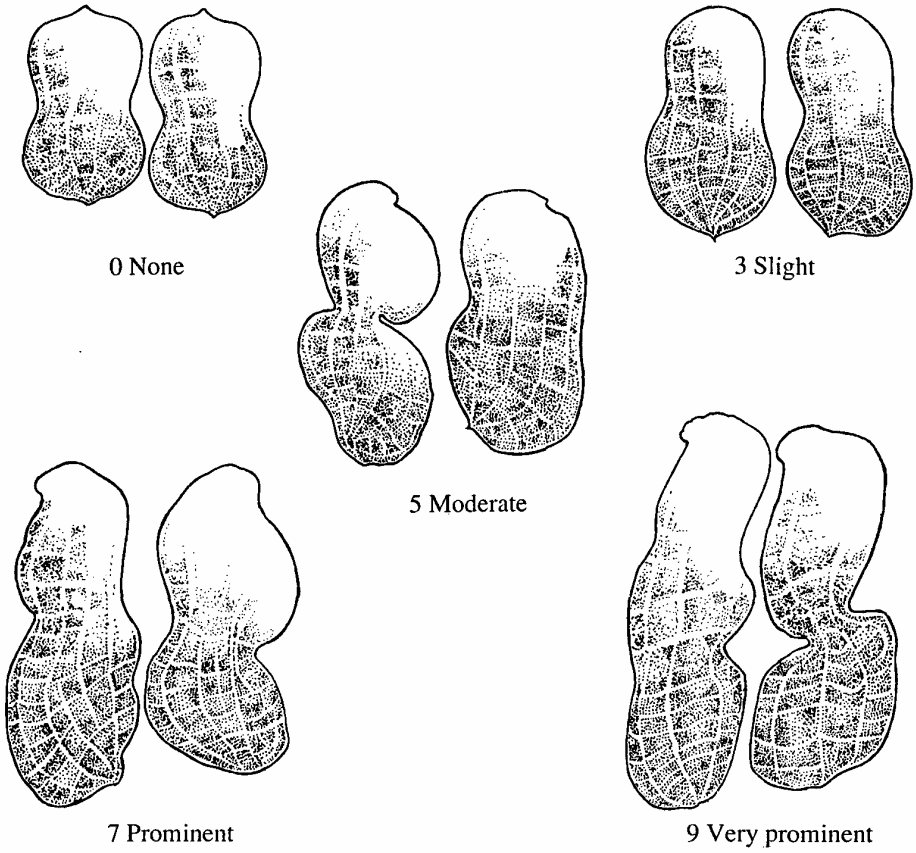


Fig. 6. Pod reticulation

4.5.5 Pod length [mm] (4.6.5)

Mean of 10 mature pods

4.5.6 Pod width [mm] (4.6.6)

Mean of 10 mature pods measured at the widest point

4.6 SEED

4.6.1 Seed colour (4.7.1)

1 One colour
2 Variegated

4.6.2 Primary seed colour (4.7.2)

Primary or major colour of seeds recorded within one month of harvest after complete drying on mature, wrinkle-free seeds. (RHS colour codes are given in parentheses beside descriptor states)

1 White (white group 155B)
2 Off-white (yellow-white group 158A)
3 Yellow (yellow group 8C)
4 Very pale tan (yellow-orange group 27C)
5 Pale tan (yellow-orange group 27A)
6 Light tan (greyed-orange group 173D)
7 Tan (greyed-orange group 174D)
8 Dark tan (greyed-orange group 172D)
9 Greyed orange (greyed-orange group 176B)
10 Rose (greyed-red group 181C)
11 Salmon (greyed-red group 179D)
12 Light red (greyed-red group 180D)
13 Red (greyed-red group 181A)
14 Dark red (greyed-red group 178A)
15 Purplish red/reddish purple (greyed-purple group 187A)
16 Light purple (red-purple group 59A)
17 Purple (purple group 79B)
18 Dark purple (purple group 79A)
19 Very dark purple (blackish) (black group 202A)
20 Other (specify in the descriptor NOTES, 4.8)

4.6.3 Secondary seed colour (4.7.3)

Secondary or minor colour on variegated seeds. Variegation types should be designated using the states below singly or in combination, using the colour states as in 4.6.2, e.g. 7/3 = secondary colour is tan (174D) and is striped. (RHS colour codes should be given in parentheses beside descriptor states by the evaluator)

1 Blotched
2 Flecks of colour
3 Striped
4 Tipped at the embryo end
5 Obscure or hazy
6 Other (specify in the descriptor NOTES, 4.8)

4.6.4 Seed length [mm] (4.7.4)

Average of 10 mature seeds

4.6.5 Seed width [mm] (4.7.5)

Measured at the midpoint, average of 10 mature seeds

4.6.6 Seed weight [g] (4.7.6)

Weight of 100 random, mature, wrinkle-free seeds

4.6.7 Special traits

Any special trait for the accession

4.7 MATURITY

4.7.1 Days to emergence (5.1.1)

From sowing or first irrigation

4.7.2 Days to 50% flowering (5.1.2)

From emergence

4.7.3 Days to maturity (5.1.3)

From emergence

1 <90
2 91-100
3 101-110
4 111-120
5 121-130
6 131-140
7 141-150
8 151-160
9 >160

4.7.4 Fresh seed dormancy [%] (5.1.4)

Germination immediately after harvest and number of days to 70% germination, e.g. 65/12 for 65% germination and 12 days for reaching 70% germination

4.7.5 Seed dormancy [%] (5.1.5)

Germination of dried seed 14 days after harvesting and number of days to 70% germination (recorded as in 4.7.4)

4.8 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 (specify in the descriptor NOTES, 5.19)
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% EMERGENCE

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 NODULATION CAPACITY (8.1)

0 None
3 Few nodules
7 Abundant nodules

6.2 YIELD COMPONENTS

6.2.1 Yield of dried pods [g m^{-2}] (5.2.2)

6.2.2 Shelling percentage [%] (5.2.1)

Based on weight of mature seed at 7-9% moisture/total weight of pod sample x 100

6.3 PROTEIN CHARACTERISTICS

6.3.1 Protein content [%]

Based on dry weight of undefatted seeds

6.4 OIL CHARACTERISTICS

6.4.1 Oil content [%] (6.1.1)

Based on weight of oil expressed/total dry weight of the sample x 100

6.4.2 Oil quality (6.1.2)

Ratio of oleic:linoleic fatty acids

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 DROUGHT (7.1)

7.2 REACTION TO SALINITY (7.2)

7.3 REACTION TO MINERAL DEFICIENCIES (7.3)

7.3.1 Iron (7.3.1)

7.3.2 Phosphorus (7.3.2)

7.3.3 Potassium (7.3.3)

7.3.4 Manganese (7.3.4)

7.3.5 Calcium (7.3.5)

7.3.6 Molybdenum (7.3.6)

7.3.7 Zinc (7.3.7)

7.3.8 Aluminium (7.3.8)

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, 8.10. 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 FOLIAR DISEASES

	Causal organism	Disease or common name	
8.1.1	*Alternaria alternata*	Alternariosis	(9.1.1)
8.1.2	*Cercospora arachidicola*	Early leaf spot	(9.1.2)
8.1.3	*Phaeoisariopsis personata*	Late leaf spot	(9.1.3)
8.1.4	*Leptosphaerulina crassiasca*	Pepper spot/leaf scorch	(9.1.4)
8.1.5	*Puccinia arachidis*	Rust	(9.1.5)
8.1.6	*Sphaceloma arachidis*	Scab	(9.1.6)
8.1.7	*Didymella arachidicola*	Web blotch	

8.2 SEED AND SEEDLING DISEASES

	Causal organism	Disease or common name
8.2.1	*Aspergillus niger*	Collar rot (9.2.1)
8.2.2	*Aspergillus niger*	Crown rot (9.2.2)
8.2.3	*Aspergillus flavus*	Seed rot (9.2.4)
8.2.4	*Aspergillus flavus*	(Aflaroot disease)
8.2.5	*Pythium myriotylum*	Pythium rot (9.2.3)
8.2.6	*Fusarium* spp. *Macrophomina phaseolina* *Rhizoctonia solani* *Sclerotium rolfsii*	Seed, seedling and pod rots (9.2.5)

8.3 ROOT AND STEM ROT

8.3.1	*Pseudomonas solanacearum*	Bacterial wilt (9.3.1)
8.3.2	*Cylindrocladium crotalariae*	Black rot (9.3.2)
8.3.3	*Fusarium* spp. *Macrophomina phaseolina* *Rhizoctonia solani* *Sclerotium rolfsii*	Root rot (9.3.3)
8.3.4	*Verticillium albo-atrum*	Verticillium wilt
8.3.5	*Sclerotium rolfsii*	Stem rot (9.3.4)

8.4 POD ROT

8.4.1	*Cylindrocladium crotalariae*	Black rot (9.4.1)
8.4.2	*Fusarium oxysporum*	Pod rot (9.4.2)
	Fusarium solani	(9.4.3)
	Macrophomina phaseolina	(9.4.4)
	Pythium myriotylum	(9.4.5)
	Rhizoctonia solani	(9.4.6)

8.5 VIRAL AND MYCOPLASMA DISEASES

	Causal organism	Disease or common name	
8.5.1	Groundnut rosette virus (GRV)	Groundnut rossette	(9.5.1)
8.5.2	Peanut stunt virus (PSV)	Peanut stunt	(9.5.2)
8.5.3	Peanut clump virus (PCV)	Peanut clump	(9.5.3)
8.5.4	Peanut mottle virus (PMV)	Peanut mottle	(9.5.4)
8.5.5	Tomato spotted wilt virus (TSWV) USA Bud necrosis virus (BNV) India	Bud necrosis	(9.5.5)
8.5.6	Peanut stripe virus (PStV)	Peanut stripe	
8.5.7	Witches' broom	Mycoplasma	(9.5.6)

8.6 FOLIAGE AND STEM FEEDING INSECTS

8.6.1	*Aphis craccivora*	Aphids	(9.6.1)
8.6.2	*Empoasca* sp.	Jassids	(9.6.2)
8.6.3	*Thrips palmi* *Frankliniella* spp. *Scirtothrips dorsalis* *Caliothrips indicus* *Enneothrips flavens*	Thrips	(9.6.3)
8.6.4	Other hemipteran pests *Nezara viridula*	Green stink bug	(9.6.4)
8.6.5	*Amsacta* spp. *Amsacta albistriga* *Amsacta moorei*		(9.6.5)
8.6.6	*Aproaerema modicella*	Groundnut leaf miner	(9.6.6)

	Causal organism	Disease or common name	
8.6.7	*Heliothis* spp. *Helicoverpa armigera* *Heliothis peltigera* *Helicoverpa zea* *Heliothis virescens*		(9.6.7)
8.6.8	*Spodoptera* spp. *Spodoptera litura* *Spodoptera littoralis* *Spodoptera frugiperda* *Spodoptera exigua*	Armyworms	(9.6.8)
8.6.9	Other lepidopterous pests *Anticarsia germmatalis* *Stegasta bosqueella* *Chrysodeixis chalcites*		(9.6.9)
8.6.10	Other arthropod pests *Tetranychus* spp.	Mites	(9.9.1)
8.7	FLOWER FEEDING INSECTS		
8.7.1	*Helicoverpa armigera*		(9.7.1)
8.7.2	*Frankliniella* spp. *Megalurothrips* spp. *Taeniothrips* spp.	Thrips	(9.7.2)
8.7.3	Meloidae	Blister beetles	
8.8	ROOT AND POD FEEDING INSECTS AND ARTHROPODS		
8.8.1	Lepidoptera *Elasmopalpus lignosellus* *Diabrotica undecimpuctata* (Chrysomelid)	Caterpillars	(9.8.1)
8.8.2	*Odontotermes* spp. *Microtermes* spp.	Termites	(9.8.2)

	Causal organism	Disease or common name
8.8.3	Scarabaeidae *Holotrichia* *Lachnosterna* *Phyllophaga*	White grubs
8.8.4	*Dorylus* spp.	Doryline arts
8.8.5	Dermaptera	Earwigs
8.8.6	Elateridae	Wireworms
8.8.7	Tenebrionidae	False wireworms
8.8.8	Tettigometridae *Hilda patruelis*	Hilda bug (9.6.4)
8.8.9	Julidae *Peridontopyge* spp.	Milliepedes
8.9	NEMATODES	
8.9.1	*Aphelenchoides arachidis*	Testa nematode (9.10.1)
8.9.2	*Belonolaimus*	Sting nematode (9.10.2)
8.9.3	*Meloidogyne* spp.	Rootknot nematode (9.10.3)
8.9.4	*Pratylenchus* spp.	Root lesion nematode (9.10.4)
8.9.5	*Xiphinema* spp.	Dagger nematode (9.10.5)
8.9.6	*Tylenchorhynchus brevilineatus*	Stunt nematode
8.9.7	*Ditylenchus destructor*	Peanut rot
8.9.8	*Scutellonema* spp.	Crop growth variability
8.9.9	*Aphasmatylenchus straturatus*	Peanut chlorosis

8.10 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 AGRONOMIC EVALUATION

M2.13 PREVIOUS MULTIPLICATION AND/OR REGENERATION

M2.13.1 Location

M2.13.2 Sowing date

M2.13.3 Plot number

M2.14 OTHERS

CONTRIBUYENTES CONTRIBUTORS COLLABORATEURS

Prof. A.H. Bunting
Department of Agricultural Botany
Reading University
White Knights
Reading RG6 2A, UK

Mr. R.W. Gibbons
Executive Director
ICRISAT Sahelian Center
and West African Programs
ICRISAT Sahelian Center
Sadoré, Niger

Dr. W.C. Gregory
Department of Crop Science
University of North Carolina
Box 5155
Raleigh NC 27650, USA

Dr. R.O. Hammons
Arachis International
1023 Lake Drive
Tifton GA 31794, USA

Dr. A. Krapovickas
Facultad de Agronomía
Universidad Nacional del Nordeste
Sargento Cabral 2139
Corrientes, Argentina

Dr. V. Ramanatha Rao
Genetic Diversity Officer
IBPGR
Via delle Sette Chiese, 142
00145 Rome, Italy

Prof. J.T. Williams
Director
IBPGR/IFAR
Tropical Tree Crops Program
1611 North Kent Street, Suite 600
Arlington
VA 22209, USA

Revisores *Reviewers* *Réviseurs*

Dr. D. McDonald
Program Director, Legumes
ICRISAT
Patancheru P.O.
A.P. 502 324, India

Dr. V. Ramanatha Rao
Genetic Diversity Officer
IBPGR
Via delle Sette Chiese 142
00145 Rome, Italy

Revisores (cont.) *Reviewers (cont'd)* *Réviseurs (cont.)*

Dr. Melak H. Mengesha
Program Leader, Genetic Resources Unit
ICRISAT
Patancheru P.O.
A.P. 502 324, India

Dr. J.P. Moss
Principal Cell Biologist
ICRISAT
Patancheru P.O.
A.P. 502 324, India

Dr. S.N. Nigam
Principal Groundnut Breeder
ICRISAT
Patancheru P.O.
A.P. 502 324, India

Dr. D.V.R. Reddy
Principal Groundnut Virologist
ICRISAT
Patancheru P.O.
A.P. 502 324, India

Dr. A.K. Singh
Germplasm Botanist Cytogeneticist
Genetic Resources Unit
ICRISAT
Patancheru P.O.
A.P. 502 324, India

Dr. J.A. Whightman
Principal Groundnut Entomologist
ICRISAT
Patancheru P.O.
A.P. 502 324, India

ACKNOWLEDGEMENTS

The ICRISAT and IBPGR wish to place on record their sincere thanks to the numerous groundnut workers around the world who have contributed to the development of the Groundnut Descriptors directly or indirectly.

The assistance of ICRISAT Information Staff; Susan D. Hall for editing and Sheila Bhatnagar for art work is gratefully acknowledged.

Ms. Adriana Alercia prepared the text for publication as well as the Spanish translation, with the strong assistance of Dr. Daniel Debouck. Mr. Abdallah Bari provided the French translation. Mr. Paul Stapleton coordinated the publication. Scientific direction was supervised by Dr. Mark Perry.

The cover illustration is published with the kind permission of the Indian Council of Agricultural Research. It is reprinted from: Ramanatha Rao, V. 1988. Botany. Pages 24–64 *in* Groundnut (Reddy, P.S., ed.). New Delhi, India: Indian Council of Agricultural Research.