PHASEOLUS VULGARIS

DESCRIPTORS

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INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

DESCRIPTORS FOR *PHASEOLUS VULGARIS*

IBPGR SECRETARIAT
Rome, 1982

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 15 members; its Executive Secretariat is provided by the Food and Agriculture Organization of the United Nations. The basic function of the IBPGR, as defined by the Consultative Group, is to promote an international network of genetic resources centres to further the collection, conservation, documentation, evaluation and use of plant germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

IBPGR Executive Secretariat
Crop Genetic Resources Centre
Plant Production and Protection Division
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IBPGR descriptor lists are available for the following crops:

Allium (1982)
Almond (1981)
Amaranth (1981)
Apricot (1980)
Banana and Plantains (1978)
Barley (1982)
Beets (1980)
Cocoa (1981)
Coconut (1978)
Coffee (1980)
Colocasia (1980)
Cotton (1980)
Cruciferous crops (1981)
Groundnut (1981)
Lupin/lupinos (1981)
Maize (1980)
Mung Bean (1980)
Pearl Millet (1981)
Phaseolus vulgaris (1982)
Pigeonpea (1981)
Potato, cultivated (1977)
Rice (1980)
Sesame (1981)
Sorghum (1980)
Sugarcane (1982)
Sweet Potato (1981)
Tomatoes (1981)
Tropical Fruits, revised (1980)
Winged Bean, revised (1982)
Wheat, revised (1981)
Yams (1980)

A full request list for IBPGR publications including Crop Reports, Descriptor Lists, Reports on Regions, Conservation and Information, Newsletters, Annual Reports and Germplasm Directories can be obtained from the IBPGR Secretariat, Rome.

PREFACE

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

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

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

DESCRIPTOR LIST FOR PHASEOLUS VULGARIS

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) present/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 Color, Munsell Color Charts for Plant Tissues are strongly recommended for all ungraded colour characters (the precise chart used should be specified) in the NOTES descriptor, 11.)

PASSPORT

1. ACCESSION DATA

1.1 ACCESSION NUMBER

This number serves as a unique identifier for accessions and is assigned by the curator when an accession is entered into his collection. Once assigned this number should never be 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 Introduction 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 Botanical variety [1/]

1.6 PEDIGREE/CULTIVAR NAME

Nomenclature and designations assigned to breeder's material

1.7 ACQUISITION DATE

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

1.7.1 Month

1.7.2 Year

1.8 DATE OF LAST REGENERATION OR MULTIPLICATION

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

1.8.1 Month

1.8.2 Year

1.9 ACCESSION SIZE

Approximate number of seeds or plants of accession in collection

---

1/ Three distinct botanical varieties can be recognized.

- vulgaris: all cultivated forms (record as vulgaris);
- aborigineus: South American wild forms, characterized by small bractlets and relatively large seeds (record as aborigineus);
- Mexican wild forms: no Latin denomination available, large ovate bractlets and very small seeds (record as Mexican);
- weedy: these types are frequently collected in the centres of origin (record as weedy).

1.10 NUMBER OF TIMES ACCESSION REGENERATED

Number of regenerations of 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 subsamples wherever they are sent.

2.2 COLLECTING INSTITUTE

Institute or person collecting/sponsoring the original sample

2.3 DATE OF COLLECTION OF ORIGINAL SAMPLE

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

2.3.1 Month

2.3.2 Year

2.4 COUNTRY OF COLLECTION OR COUNTRY WHERE CULTIVAR/VARIETY BRED

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

2.5 PROVINCE/STATE

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

2.6 LOCATION OF COLLECTION SITE

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

2.7 LATITUDE OF COLLECTION SITE

Degrees and minutes followed by N (north) or S (south), e.g. 1030S

2.8 LONGITUDE OF COLLECTION SITE

Degrees and minutes followed by E (east) or W (west), e.g. 7625W

2.9 ALTITUDE OF COLLECTION SITE

Elevation above sea level in metres

2.10 COLLECTION SOURCE

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

2.11 STATUS OF SAMPLE

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

2.12 LOCAL/VERNACULAR NAME

Name given by farmer to cultivar/landrace/weed

2.13 NUMBER OF PLANTS SAMPLED

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

2.14 PHOTOGRAPH

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

0 No
\+ Yes

2.15 HERBARIUM SAMPLE TAKEN

0 No
\+ Yes

2.16 TYPE OF MATERIAL

1 Pure line
2 Mixtures
3 Segregating
9 Other (specify in NOTES descriptor, 11)

2.17 GROWTH HABIT

1 Determinate bush
2 Indeterminate bush (with one main guide)
3 Indeterminate semi-climber or prostrate (with many lateral guides)
4 Indeterminate climber

2.18 IF UNDER CULTIVATION - CROP

1 Monoculture
2 Mixed with maize
3 Mixed with cassava
4 Mixed with other crops

2.19 TOPOGRAPHY

1 Swamp
2 Flood plain
3 Plain level
4 Undulating
5 Hilly
6 Mountainous
7 Other (specify in NOTES descriptor, 11)

2.20 HEALTH CONDITION OF MATERIAL

3 Healthy
5 Moderately healthy
7 Unhealthy

2.21 OTHER NOTES FROM COLLECTOR

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

CHARACTERIZATION AND PRELIMINARY EVALUATION DATA

3. SITE DATA

3.1 COUNTRY OF CHARACTERIZATION AND PRELIMINARY EVALUATION

3.2 SITE (RESEARCH INSTITUTE)

3.3 NAME OF PERSON IN CHARGE OF CHARACTERIZATION

3.4 SOWING DATE

3.4.1 Day

3.4.2 Month

3.4.3 Year

3.5 FIRST HARVEST DATE

3.5.1 Day

3.5.2 Month

3.5.3 Year

3.6 LAST HARVEST DATE

3.6.1 Day
3.6.2 Month
3.6.3 Year

4. PLANT DATA

4.1 VEGETATIVE

4.1.1 Leaflet length

Measured on terminal leaflet of third trifoliate leaf from pulvinus to leaf tip on plants grown under field conditions

4.1.2 Plant type

1 Determinate bush
2 Indeterminate bush with erect branches
3 Indeterminate bush with prostrate branches
4 Indeterminate with semi-climbing main stem and branches
5 Indeterminate with moderate climbing ability and pods distributed evenly up the plant
6 Indeterminate with aggressive climbing ability and pods mainly on the upper nodes of the plant
7 Other (specify in the NOTES, descriptor 11)

4.2 INFLORESCENCE AND FRUIT

4.2.1 Node number on main stem from base to first inflorescence

Average of 5 plants
For indeterminate types: from base to first axillary inflorescence
For determinate types: from base to terminal inflorescence

4.2.2 Days to flowering

Number of days from emergence to stage where 50% of plants have set flowers

4.2.3 Flower buds per inflorescence

Average number of flower buds from 10 plants examining one inflorescence from each plant. 1/

4.2.4 Colour of standard

In freshly opened flowers; the colours of freshly opened flowers are highly changeable after opening		Probable genotype
1	White	ppT-Rk P-tt Rk - P-T-rk rk
2	Green	pp---argarg
3	Lilac	P-T-C-rkrkV-meme
4	White with lilac edge	
5	White with red stripes	
6	Dark lilac with purple outer edge	
7	Dark lilac with purplish spots	
8	Carmine red	P-T-C-rkrkV-meme stst
9	Purple	P-T-C-Rk-V-ME-stst
10	Other (specify in the NOTES, descriptor 11)	

4.2.5 Colour of wings

In freshly opened flowers.
The probable genotypes of standard (4.2.4) and wing colour combinations are given in Appendix II

1 White
2 Green
3 Lilac
4 White with carmine stripes

(Continued)

1/ N.B. If determinate type, count the terminal inflorescence; if indeterminate type, examine from lateral inflorescence (3rd from apex)

5 Strongly veined in red to dark lilac
6 Plain red to dark lilac
7 Lilac with dark lilac veins
8 Purple
9 Other (specify in the NOTES, descriptor 11)

4.2.6 Pod colour

	From fully expanded immature pod		Probable genotype (2 loci model for 'V')
1	Dark purple		P V Me C stst
2	Carmine red		(P v Me C stst
			(P v meme C stst
3	Purple stripe on green		P V Me C St
4	Carmine stripe on green		P V meme C St
5	Pale red stripe on green		P V meme C St
6	Dark pink (rose)		P V meme C ss
7	Normal green		pp-----Y Arg Ace
		or	Ptt----Y Arg Ace
		or	P Tcc--Y Arg Ace
8	Shiny green		As above for 'normal' green, but aceace
9	Dull green to silver grey		As above for 'normal' green, but argarg
10	Golden or deep yellow		As above for 'normal' green, but yy Arg--
11	Pale yellow to white		As above for 'normal' green but yy argarg
12	Other (specify in the NOTES, descriptor 11)		

4.2.7 Pod length

Average length in centimetres of the largest fully expanded immature pods from 10 random normal plants

4.2.8 Pod cross-section

From fully expanded immature pod (Figure 1)

(Continued)

		Probable genotype
1	Very flat	EaEa EbEb
2	Pear shaped	
3	Round elliptic	eaea ebeb
4	Figure of eight	
5	Other (specify in the NOTES descriptor, 11)	

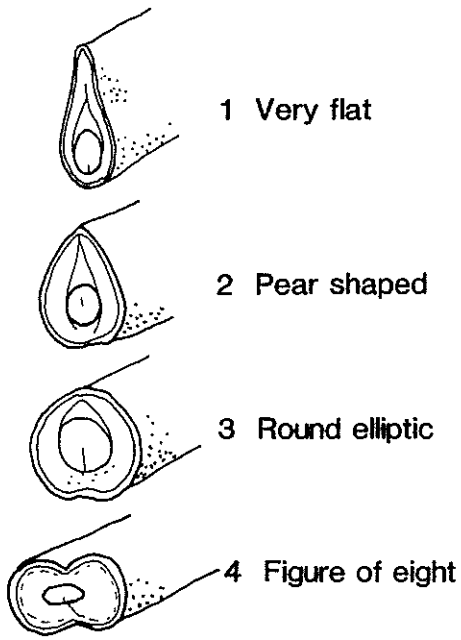

Figure 1. Pod cross-section

4.2.9 Pod curvature

Of fully expanded immature pod (Figure 2)

		Probable genotype
3	Straight	Da Db
5	Slightly curved	
7	Curved	
9	Recurving	da db

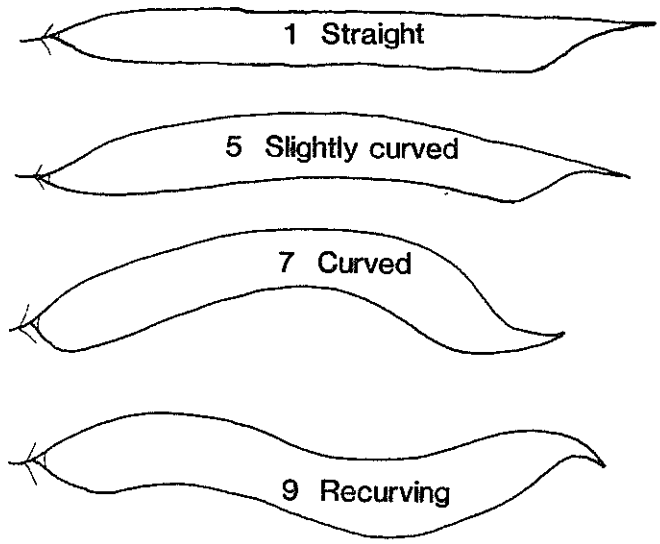

Figure 2. Pod curvature

4.2.10 Pod suture string

0 Stringless
3 Few strings
5 Moderately stringy
7 Very stringy

4.2.11 Pod colour at physiological maturity

		Probable genotype
1	Dark purple	P-V-Me-C-stst
2	Red	P-vv Me-C-stst
		P-vv memeC-stst
3	Pink	P-V-memeC-stst
4	Yellow	
5	Pale yellow with coloured mottling or stripes	
6	Persistent green	ffpp ---Y-Arg-Ace-
		P-T-cc--Y-Arg-Ace-

4.2.12 Pod wall fibre

Probable genotype

See Figure 3

3 Strongly contracting (at dry maturity adhering around seed). Fleshy type — fafa fbfb fcfc

5 Leathery podded (dry pods will not spontaneously open)

7 Excessive shattering (with strong twisting of dry pods).

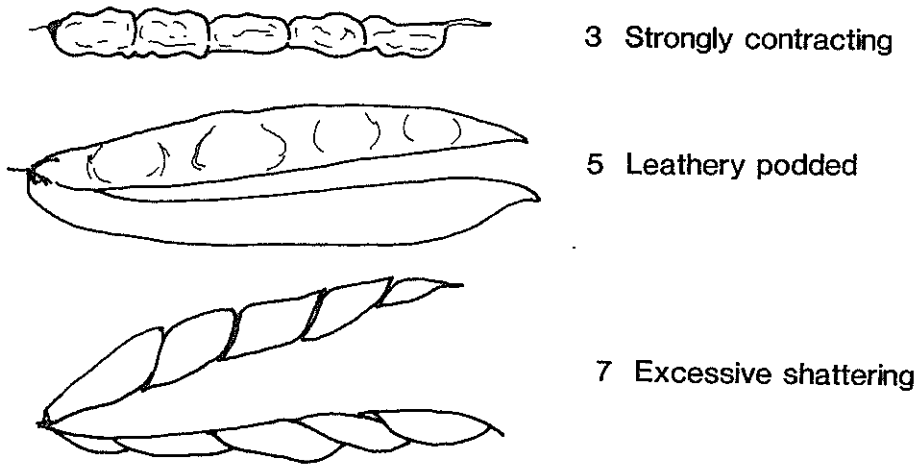

Figure 3. Pod wall fibre

4.2.13 Locules per pod

Number of locules from longest pod of 10 random normal plants

4.3 SEED

4.3.1 Seed coat patterns See Figure 4	Latinized description	Probable genotype
0 Absent		
1 Constant mottled	marmoratus	M -
2 Striped	striatus	St -
3 Rhomboid spotted	rhomboidius	Rho -
4 Speckled	punctatus	Res -
5 Circular mottling	circumdatus (In P. coccineus & vulgaris x coccineus (hybrid)	Cir -
6 Marginal colour pattern	marginatus	marmar(inTT)
7 Broad striped	zebrinus	zebzeb
8 Bicolor		tt EE Punc -
9 Spotted bicolor		tt EE punc punc
10 Pattern around hilum (face)		(all P-ttee) e.g. bipbip, etc.
11 Other (specify in the NOTES, descriptor 11)		

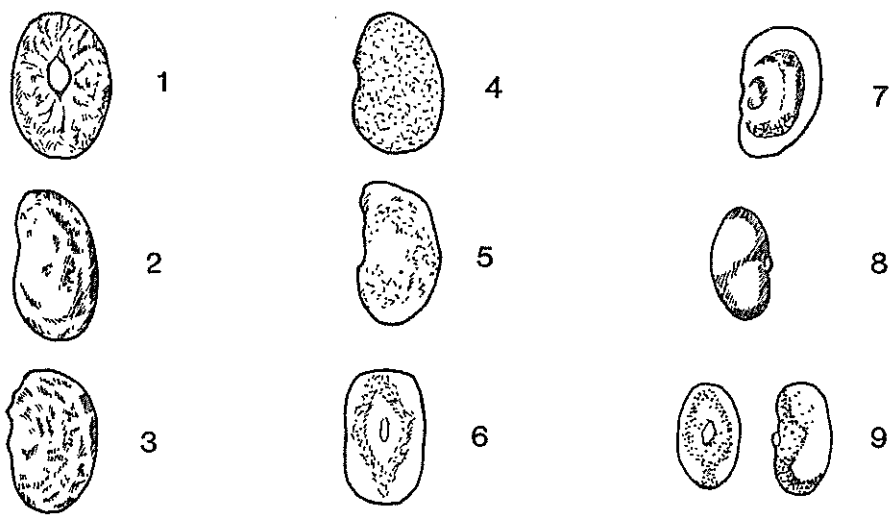

Figure 4. Seed coat patterns

4.3.2 Seed coat darker colour [1/]

		Probable genotype	
		Yellow-black series (all rK)	Green-red series (all rK)
1	Black	C-G-B-V-J	GGBBVVMe
2	Brown, pale to dark	C-GgB-V-	GGBBV-meme
3	Maroon		ggbbV-meme
4	Grey, brownish to greenish	C-G-bbV-jj	
5	Yellow to greenish yellow	C-ggbbvv J-	
6	Pale-cream to buff	ccggbbvv J-	
7	Pure white	pp---------	
8	Whitish	ccG-bbvvjj	
9	White, purple tinged	ccggbbV-jj	
10	Chlorophyll green	P-ccggbbvvjjChCh	
11	Green to olive		ggBBv-meme
12	Red		GGbbvv
13	Pink		ggbbvv
14	Purple		GGbbV-Me-
15	Other (specify in the NOTES, descriptor 11)		

4.3.3 Seed coat lighter colour [1/]

Choose from states of descriptor 4.3.2

4.3.4 Brilliance of seed

3 Matt
5 Medium
7 Shiny

1/ When both darker and lighter colours occur the paler is always genetically related to the darker colour by a difference in a single enzyme.

4.3.5 Seed shape

Taken from middle of pod (see Figure 5)

1 Round
2 Oval
3 Cuboid
4 Kidney shaped
5 Truncate fastigiate

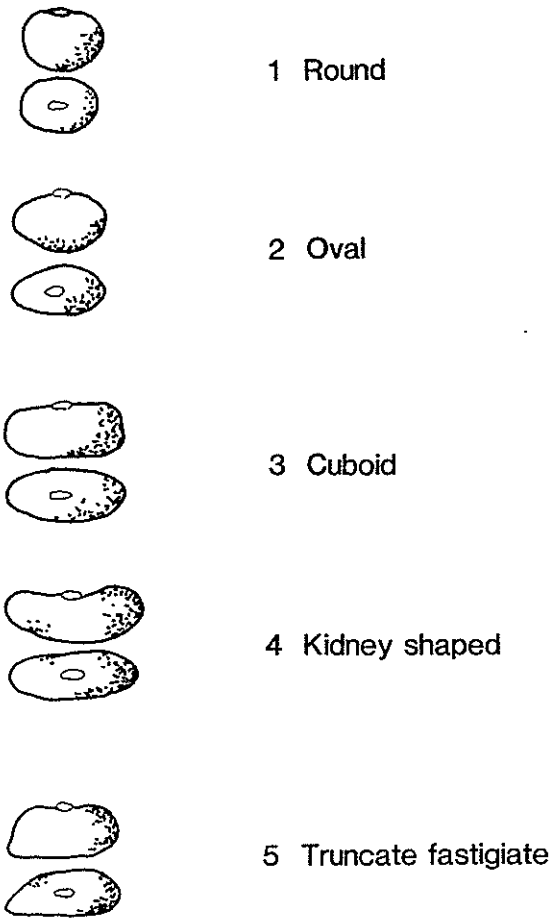

Figure 5. Seed shape

FURTHER CHARACTERIZATION AND EVALUATION

5. SITE DATA

5.1 COUNTRY OF FURTHER CHARACTERIZATION AND EVALUATION

5.2 SITE (RESEARCH INSTITUTE)

5.3 NAME OF PERSON IN CHARGE OF EVALUATION

5.4 SOWING DATE

5.4.1 Day

5.4.2 Month

5.4.3 Year

5.5 FIRST HARVEST DATE

5.5.1 Day

5.5.2 Month

5.5.3 Year

5.6 LAST HARVEST DATE

5.6.1 Day

5.6.2 Month

5.6.3 Year

6. PLANT DATA

6.1 VEGETATIVE

6.1.1 Hypocotyl length

Average length in centimetres from 10 plants measured when primary leaf is fully expanded

6.1.2 Hypocotyl pigmentation

		Probable genotype
1	Purple	P-C-V-Me
2	Green	P-C-vv
3	Other (specify in the NOTES, descriptor 11)	

6.1.3 Emerging cotyledon colour

1	Purple	P-C-V-Me--
2	Red	P-C-V-meme
3	Green	P-C-vv
4	White	pp - - 1h1h
5	Very pale green	pp - - 1h1h
6	Other (specify in the NOTES, descriptor 11)	

6.1.4 Leaf colour of chlorophyll

3	Pale green
5	Medium green
7	Dark green

6.1.5 Leaf colour of anthocyanin

0	Absent
+	Present

6.1.6 Leaf shape

Of terminal leaflet of third trifoliate leaf

1	Triangular
2	Quadrangular
3	Round

6.1.7 Days to maturity

Number of days from emergence until 90% of pods are mature

6.1.8 Leaf persistence

When 90% of pods in plot are dry

3	All leaves dropped
5	Intermediate
7	All leaves persistent

6.1.9 Plant height

Average, in centimetres, at maturity from 5 plants measured from cotyledon scar to tip of plant

6.1.10 Stem diameter

Measured in millimetres at maturity for plants at crop density

6.1.11 Lodging

3 Upright (all plants)
5 Intermediate
7 Lodged (all plants)

6.1.12 Node number at harvest

On main stem

6.2 INFLORESCENCE AND FRUIT

6.2.1 Flower bud size

Just before opening

3 Small
5 Medium
7 Large

6.2.2 Size of bracteole

3 Small
5 Medium
7 Large

6.2.3 Shape of bracteole

3 Lanceolate
5 Intermediate
7 Ovate

6.2.4 Bracteole/calyx length relation

Bracteole measured in relation to calyx

3 Shorter than or equal to
5 Up to 1/3 longer
7 Twice as long

6.2.5 Calyx/bracteole colour

1 Green
2 Pale violet
3 Dark purple
4 Other (specify in the NOTES, descriptor 11)

6.2.6 Wing opening

3 Parallel closed wings
5 Wings moderately diverging
7 Wings widely diverging

6.2.7 Style protrusion

Protrusion of style outside the top of the keel

0 Not protruding
+ Protruding

6.2.8 Racemes per plant

Average from 10 plants at crop density

6.2.9 Inflorescence length

Average, in millimetres, from 10 plants examining one inflorescence from each plant 1/

6.2.10 Pedicel length

Average, in millimetres, of oldest flower from 10 plants examining one inflorescence from each plant 1/

6.2.11 Duration of flowering

Number of days from first flowers in 50% of the plants to the stage when 50% of the plants have stopped flowering

---

1/ N.B. If determinate type count the terminal inflorescence, if indeterminate type examine from lateral inflorescence (3rd from apex).

6.2.12 Position of pods

1 Base
2 Centre
3 Top
4 Combination of 1, 2 and 3
5 Other (specify in the NOTES, dscriptor 11)

6.2.13 Pod width

Average width in millimetres of the largest fully expanded immature pods from 10 random normal plants

6.2.14 Pod beak length

Measured in millimetres from end of last loculus

6.2.15 Pod beak position

See Figure 6

1 Marginal
2 Non-marginal
3 Other (specify in the NOTES, descriptor 11)

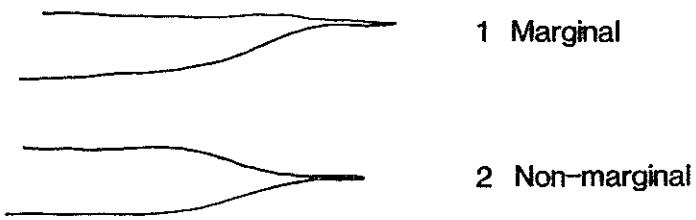

Figure 6. Pod beak position

6.2.16 Pod beak orientation

See Figure 7

3 Upward (curving to dorsal side)
5 Straight
7 Downward (curving to ventral side)

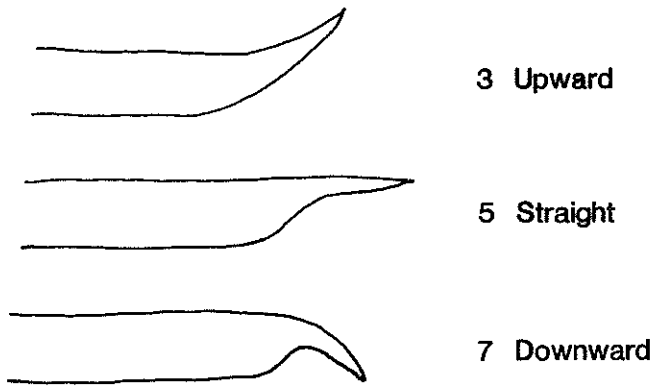

Figure 7. Pod beak orientation

6.2.17 Dry pod colour		Probable genotype (2 loci model for 'V')
1 Dark purple		P V Me C stst
2 Carmine red		(P v Me C stst
		(P v meme C stst
3 Purple stripe on green		P V Me C St
4 Carmine stripe on green		P V meme C St
5 Pale red stripe on green		P V meme C St
6 Dark pink (rose)		P V meme C ss
7 Normal green		pp------Y Arg Ace
	or	Ptt----Y Arg Ace
	or	P Tcc--Y Arg Ace
8 Shiny green		As above for 'normal' green, but aceace
9 Dull green to silver grey		As above for 'normal' green, but argarg
10 Golden or deep yellow		As above for 'normal green, but yy Arg--

(Continued)

		Probable genotype
11	Pale yellow to white	As above for 'normal' green, but yy argarg
12	Other (specify in the NOTES, descriptor 11)	

6.2.18 Pods per plant

Average from 10 plants at crop density

6.3 SEED

6.3.1 Seeds per pod

Average number of seeds from one pod selected from 10 plants

6.3.2 Apparent seed veining

0 Absent
\+ Present

6.3.3 Seed weight

Weight of 100 seeds in milligrams to the first decimal place at a moisture content of 12-14%

6.3.4 Seed volume

Volume, in millimetres, of ethanol at 94% strength that is displaced by 100 seeds

6.3.5 Seed dimensions

Average, in millimetres, of 10 seeds from 10 plants

6.3.5.1 Length
Measured parallel to the hilum

6.3.5.2 Width

6.3.5.3 Height
Measured from hilum to opposite side

6.3.6 Percentage seed protein

6.3.7 Percentage seed protein of a check variety

E.g. Black Turtle Soup

6.3.7.1 Percentage

6.3.7.2 Name of check variety

7. STRESS SUSCEPTIBILITY

These reactions are coded 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 HUMIDITY

7.5 SALINITY

7.6 SOIL ACIDITY (LOW AVAILABLE PHOSPHOROUS LEVEL)

8. PEST AND DISEASE SUSCEPTIBILITY

These reactions are coded on a 1-9 scale as in Section 7.

In each case, it is important to state the origin of the infection or infestation, i.e. natural, field inoculation, laboratory test (specify). Record such information in the NOTES descriptor, 11

8.1 PESTS		Vernacular name
8.1.1	Acanthoscelides obtectus (Say)	Bruchids
8.1.2	Apion godmani	Bean pod weevil
8.1.3	Aphis spp.	Aphids
8.1.4	Bemisia tabaci (Genn.)	Whitefly
8.1.5	Caliothrips braziliensis	Thrips
8.1.6	Cerotoma spp.	Leaf-feeding insects

		Vernacular name
8.1.7	Diabrotica spp.	Leaf-feeding insects
8.1.8	Empoasca kraemeri	Leafhopper
8.1.9	Heliothis spp.	Pod borer
8.1.10	Maruca testulalis (Gey.)	Pod borer
8.1.11	Zabrotes subfasciatus	Bruchids
8.1.12	Epinotia spp.	
8.1.13	Hedilepta indicata	
8.1.14	Meloidogyne spp.	
8.1.15	Pratylenchus spp.	
8.1.16	Polyphagot arsonemus latus	Tarsonomid mites
8.1.17	Tetranychus spp.	Spider mites
8.1.18	Slugs	
8.2	FUNGI	
8.2.1	Alternaria spp.	Alternaria leaf and pod spot
8.2.2	Ascochyta spp.	Ascochyta leaf spot
8.2.3	Botrytis cinerea Pers. ex Fr.	Grey mould
8.2.4	Cercospora spp.	Cercospora leaf spot
8.2.5	Colletotrichum lindemethianum	Anthracnose
8.2.6	Diaporthe spp.	Diaporthe pod blight
8.2.7	Erysiphe polygoni DC ex Merat.	Powdery mildew
8.2.8	Fusarium spp.	Root rot
8.2.9	Macrophomina phaseoli (Maubl.)	Ashy stem blight
8.2.10	Phoesisariopsis griseola (Ferraris)	Angular leaf spot
8.2.11	Phytophthora phaseoli (Thaxter)	Downy mildew
8.2.12	Pseudocercosporella albida (Matta & Balliard)	White leaf spot
8.2.13	Pythium spp.	Root rot
8.2.14	Rhizoctonia spp.	Root rot
8.2.15	Sclerotinia sclerotiorum (Lib.) de Bary	White mould

		Vernacular name
8.2.16	Thanatephorus cucumeris (Frank) Dark	Web blight
8.2.17	Uromyces phaeoli (Pers.) Winter	Rust

8.3 BACTERIA

8.3.1	Corynebacterium flaccumfaciens (Hedges) Dowson	Bacterial wilt
8.3.2	Pseudomonas phaseolicola	Halo blight
8.3.3	Pseudomonas syringae van Hall	Bacterial brown spot
8.3.4	Pseudomonas tabaci (Wolf & Foster) Stevens	Wildfire
8.3.5	Xanthomonas phaseoli (E.F. Sm.) Dowson	Bacterial blight

8.4 VIRUS AND MICOPLASMA

8.4.1 Alfalfa mosaic virus

8.4.2 Bean chlorotic mottle virus

8.4.3 Bean common mosaic virus

8.4.4 Bean curly dwarf mosaic virus

8.4.5 Bean golden mosaic virus

8.4.6 Bean rugose mosaic virus

8.4.7 Bean southern mosaic virus

8.4.8 Bean summer death

8.4.9 Bean yellow mosaic virus

8.4.10 Bean yellow stipple virus

8.4.11 Cucumber mosaic virus

8.4.12 Curly top virus

8.4.13 Euphorbia mosaic virus

8.4.14 Mycoplasma diseases

8.4.15 Red node (tobacco streak virus)

8.4.16 Rhynchosia mosaic virus

8.4.17 Tomato spotted wilt virus

9. ALLOENZYME COMPOSITION

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

10. CYTOLOGICAL CHARACTERS AND OTHER IDENTIFIED GENES

11. NOTES

Give additonal information where descriptor state is noted as 'Other' as, for example, in descriptors 2.10, 4.3.1, etc. Also include here any further relevant information, e.g. on the origin of infestation scored in Section 8.

APPENDIX I

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APPENDIX II

The following combination of standard and wing colours have the probable genotype given.

Phenotypic Description	Probable genotype
Banner and wings white or greenish usually yellowing during the day of opening	ppTRk, PttRk or PTrkrk----
Banner white or greenish, pale red to red veins in wings	PttCrkrk (V st / vv stst)
Banner white, wings red to mauve veined	PTCrkrkvv---- (Saeq aeq / st st / St aeq aeq)
Banner lilac, wings strongly veined red to mauve	PTCrkrkVmeme(stst)
Banner and wings both reddish to mauve	PTCRkVmeme(stst)
Banner ± white with lilac outer edge, wings lilac to mauve veined	PTCrkrkvv--- (St, aeq aeq or St)
Banner lilac with darker mauve outer edge, wings lilac to mauve veined	PTCrkrkVmemeSt
Banner white with reddish purple border, wings white	PTCRkvv----St
Banner lilac to mauve with darker outer margin. Wings lilac to mauve	PTCRkVVmemeSt
Dark mauve to purple magenta banner and wings, deep brownish purple in proximal half of banner	PTCRkVMe
Banner carmine red, wings white	P?TCrkrkVmeme ?M ?stst
Banner dark bluish purple, wings rose to mauve	PTCrkrkVMe ?m ?stst

APPENDIX II
(Continued)

Phenotypic Description	Probable genotype
Banner and wings both deep mauve and purple	PTCRkVMe stst
Begonia red flowers (P. coccineus or species hybrid only)	PTC-----Beg
Mottled or striped in P. coccineus or	?
Banner strongly green, wings white	pp----argarg (or lhlh)
Other (specify)	