Key access and utilization descriptors for bean genetic resources

This list consists of an initial set of characterization and evaluation descriptors for bean utilization. This strategic set of descriptors, together with passport data, will become the basis for the global accession level information portal being developed by Bioversity International with the financial support of the Global Crop Diversity Trust. It will facilitate access to and utilization of bean accessions held in genebanks and does not preclude the addition of further descriptors, should data subsequently become available.

Based on the comprehensive list of ‘Phaseolus vulgaris Descriptors’ published by IBPGR (now Bioversity International) in 1982, the list was subsequently compared and harmonized, wherever possible, with minimum descriptors listed in ‘Descriptors for Phaseolus’ (USDA, ARS, GRIN), UPOV technical guidelines (2005), ‘Handbook on evaluation of Phaseolus Germplasm’ (PHASELIEU, 2001) and ‘Standard System for the Evaluation of Bean Germplasm’ (CIAT, 1987) under the scientific guidance of Dr Daniel Debouck (CIAT).

This minimal set defines a first priority set of descriptors to describe, to access and to utilize bean genetic resources. A worldwide distribution of experts involved in an online survey was assured and the list was afterwards validated by a Core Advisory Group (see ‘Contributors’) led by Dr Daniel Debouck.

Biotic and abiotic stresses included in the list were chosen because of their cosmopolitan nature, wide geographic occurrence and significant economic impact at a global level.

Numbers in parentheses on the right-hand side are the corresponding descriptor numbers listed in the 1982 publication. Descriptors with numbers ending in ‘letters’ are new descriptors that were added during the development of the list below.

PLANT DATA

Use category

1  Dry beans
2  Snap beans
3  Green shelled beans
4  Popping beans

Plant growth habit

1  Determinate bush
2  Indeterminate bush
3  Indeterminate prostrate or vining but not climbing
4  Indeterminate climbing
5  Determinate climbing
6  Mixture

Days from sowing to 50% flowering

Number of days from sowing to a stage where 50% of plants have set flowers
2 Key access and utilization descriptors for bean genetic resources

Colour of flower standard (banner) (4.2.4)
In freshly opened flowers. The colours of freshly opened flowers are highly changeable after opening

1. White
2. Green
3. Lilac
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
9. Purple
99. Other (specify in descriptor Notes)

Colour of flower wings (4.2.5)
In freshly opened flowers

1. White
2. Green
3. Lilac
4. White with carmine stripes
5. Strongly veined in red to dark lilac
6. Plain red to dark lilac
7. Lilac with dark lilac veins
8. Purple
99. Other (specify in descriptor Notes)

Pod colour (4.2.6)
From fully expanded immature pod

1. Dark purple
2. Carmine red
3. Purple stripe on green
4. Carmine stripe on green
5. Pale red stripe on green
6. Dark pink (rose)
7. Normal green
8. Shiny green
9. Dull green to silver grey
10. Golden or deep yellow
11. Pale yellow to white
99. Other (specify in descriptor Notes)

Days to 90% pod maturity (6.1.7)
Number of days from emergence until 90% of pods are mature
SEED COLOUR

Seed coat pattern (4.3.1)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Absent</td>
</tr>
<tr>
<td>1</td>
<td>Mottled</td>
</tr>
<tr>
<td>2</td>
<td>Striped</td>
</tr>
<tr>
<td>3</td>
<td>Speckled</td>
</tr>
<tr>
<td>4</td>
<td>Spotted</td>
</tr>
<tr>
<td>5</td>
<td>Blotched</td>
</tr>
<tr>
<td>99</td>
<td>Other (specify in descriptor Notes)</td>
</tr>
</tbody>
</table>

Seed coat colour (4.3.2)
The main colours are listed below. If the seed has more than one colour the secondary and tertiary colours are also recorded using the same colour codes as for the primary colour.

<table>
<thead>
<tr>
<th>Code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White</td>
</tr>
<tr>
<td>2</td>
<td>Cream</td>
</tr>
<tr>
<td>3</td>
<td>Yellow</td>
</tr>
<tr>
<td>4</td>
<td>Brown</td>
</tr>
<tr>
<td>5</td>
<td>Pink</td>
</tr>
<tr>
<td>6</td>
<td>Red</td>
</tr>
<tr>
<td>7</td>
<td>Purple</td>
</tr>
<tr>
<td>8</td>
<td>Black</td>
</tr>
<tr>
<td>99</td>
<td>Other (specify in descriptor Notes)</td>
</tr>
</tbody>
</table>

Brilliance of seed (4.3.4)

<table>
<thead>
<tr>
<th>Code</th>
<th>Brilliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Dull</td>
</tr>
<tr>
<td>5</td>
<td>Medium</td>
</tr>
<tr>
<td>7</td>
<td>Shiny</td>
</tr>
</tbody>
</table>

Seed shape (4.3.5)

Taken from middle of pod

<table>
<thead>
<tr>
<th>Code</th>
<th>Shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Round</td>
</tr>
<tr>
<td>2</td>
<td>Oval</td>
</tr>
<tr>
<td>3</td>
<td>Cuboid</td>
</tr>
<tr>
<td>4</td>
<td>Kidney shaped</td>
</tr>
<tr>
<td>5</td>
<td>Markedly truncate</td>
</tr>
</tbody>
</table>

100-seed weight [g] (6.3.3)

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

1 For mixed material separate the variants and name them accordingly by a letter after the accession number
Phaseolin type\(^2\) (6.3.X)
The phaseolin types should be indicated by a letter, e.g. T, C, S, as it has been indicated in specialized publications such as Toro O, CH Ocampo & DG Debouck, 2007. ‘Phaseolin: variability and reference materials in wild and cultivated common bean’. Annual Rept. Bean Improvement Cooperative (USA) 50: 69-70. Once the phaseolin type has been indicated by a conventional letter, then a digital image of the gel with the particular accession under study can be added.

ABIODIC STRESSES

Drought (7.3)

BIOTIC STRESSES

Bruchid \((Acanthoscelides obtectus)\) (8.1.1)
Bruchid \((Zabrotes subfasciatus)\) (8.1.11)
Anthracnose \((Colletotrichum lindemuthianum)\) (8.2.5)
Halo blight \((Pseudomonas syringae pv. phaseolicola)\) (8.3.2)
Bacterial blight \((Xanthomonas campestris pv. phaseoli)\) (8.3.5)
Bean common mosaic virus \((BCMV)\) (8.4.3)

NOTES
Any additional information may be specified here, particularly that referring to the category ‘99=Other’ present in some of the descriptors above.

CONTRIBUTORS
Bioversity is grateful to all the scientists and researchers who have contributed to the development of this strategic set of ‘Key access and utilization descriptors for bean genetic resources’, and in particular to Dr Daniel Debouck who provided valuable scientific direction. Adriana Alercia provided technical expertise and guided the entire production process.

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