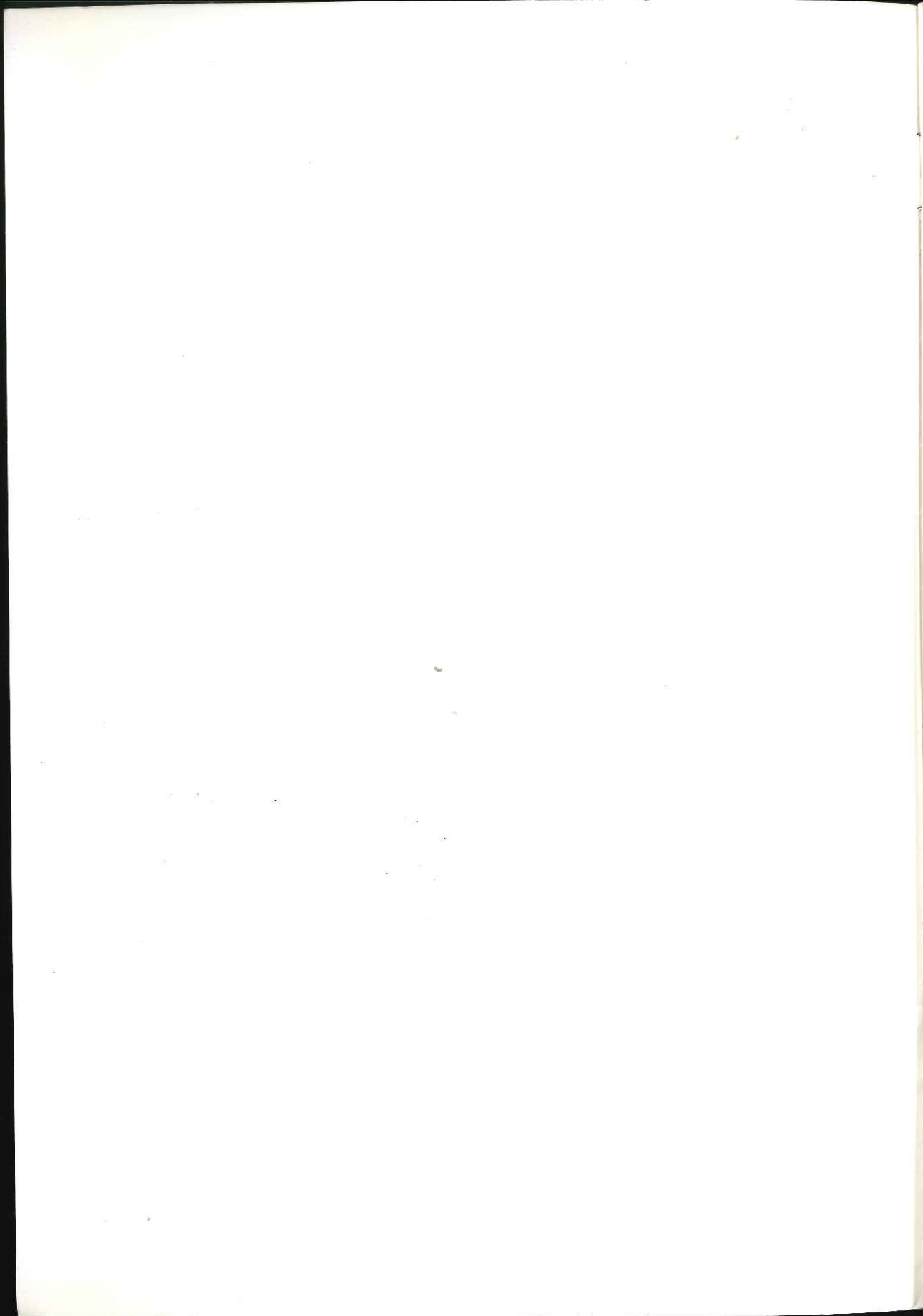




SAFFLOWER DESCRIPTORS



AGPG:IBPGR/81/93

May 1983

INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

DESCRIPTORS FOR SAFFLOWER

IBPGR Library

IBPGR SECRETARIAT

Rome, 1983

30/15/1983/10/12
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IBPGR Executive Secretariat
Crop Genetic Resources Centre
Plant Production and Protection Division
Food and Agriculture Organization of the United Nations
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10/12/83
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IBPGR descriptor lists have been published for the following crops:

<u>Allium</u> (1982)	Mung Bean (1980)
Almond (1981)	Oca (1982)
Amaranth (1981)	Pear (1983)
Apple (1982)	Pearl Millet (1981)
Apricot (1980)	<u>Phaseolus vulgaris</u> (1982)
Banana and Plantains (1978)	Pigeonpea (1981)
Barley (1982)	Potato, cultivated (1977)
Beets (1980)	Rice (1980)
Cocoa (1981)	Sesame (1981)
Coconut (1978)	Sorghum (1980)
Coffee (1980)	Sugarcane (1982)
<u>Colocasia</u> (1980)	Sweet Potato (1981)
Cotton (1980)	Tomatoes (1981)
Groundnut (1981)	Tropical Fruits, revised (1980)
Lima Bean (1982)	Winged Bean, revised (1982)
Lupin/lupinos (1981)	Wheat, revised (1981)
Maize (1980)	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 Executive Secretariat, Rome.

PREFACE

A list of descriptors was prepared by the International Board for Plant Genetic Resources (IBPGR), in consultation with Professor A. Ashri, Hebrew University, Rehovot, Israel. During the first International Safflower Conference, University of California, Davis, 12-16 July 1981, the IBPGR convened an Ad Hoc meeting to finalize this list of descriptors. The participants are listed in the Appendix.

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. 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 definite scheme, this format has the full backing of the IBPGR and is promoted world-wide. 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 SAFFLOWER

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 Colour 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 Subspecies

1.5.4 Botanical variety

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 of accession in collection

1.10 NUMBER OF TIMES ACCESSION REGENERATED

Number of regenerations or multiplications since original collection

2. COLLECTION DATA

2.1 COLLECTOR'S NUMBER

Original number assigned by collector of the sample normally composed of the name or initials of the collector(s) followed by a number. This item is essential for identifying duplicates held in different collections and should always accompany 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

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 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 Other (specify in the NOTES descriptor, 11)

2.12 LOCAL/VERNACULAR NAME

Name given by farmer to cultivar/landrace/weed

2.13 NUMBER OF PLANTS SAMPLED

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

2.14 PHOTOGRAPH

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

0 = No

+ = Yes

2.14.1 Photograph Number

If photo has been taken provide any identification number/system

2.15 OTHER NOTES FROM COLLECTION

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 HARVEST DATE

3.5.1 Day

3.5.2 Month

3.5.3 Year

4. PLANT DATA

4.1 VEGETATIVE

4.1.1 Rosette period

Expressed as number of days from date of emergence

4.1.2 Location of branches on main axis

- 0 No branches
- 1 Predominantly basal
- 2 Predominantly on the upper third of the plant
- 3 Predominantly on the upper two-thirds of the plant
- 4 From base to apex

4.1.3 Angle of branches

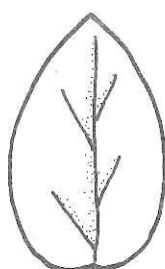
- 0 No branches
- 3 Appressed, 15° to 20°
- 5 Intermediate, 20° to 60°
- 7 Spreading, 60° to 90°
- 9 Drooping, $>90^{\circ}$

4.1.4 Internode length

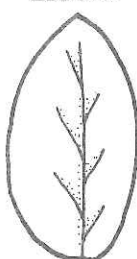
- 3 Short
- 5 Intermediate
- 7 Long

4.1.5 Leaf shape (upper stem leaves)
See Fig. 1

1. Ovate
2. Oblong
3. Lanceolate
4. Linear



Ovate



Oblong



Lanceolate



Linear

Fig. 1. Leaf shape

4.1.6 Leaf margin
See Fig. 2

1. Entire
2. Serrate or dentate
3. Deeply serrate



Entire



Serrate or dentate



Deeply serrate

Fig. 2. Leaf margin

4.1.7 Leaf colour

1. Light green (yellowish tinge)
2. Dark green (bluish tinge)
3. Greyish
4. Other (specify in the NOTES descriptor, 11)

4.1.8 Extent of leaf spininess

- 0 Non-spiny
- 3 Few spines
- 5 Intermediate
- 7 Many spines

4.1.9 Leaf hairiness

- 0 Non-hairy
- 3 Few hairs
- 5 Intermediate
- 7 Many hairs

4.1.10 Outer Involucral Bracts (OIB) Width

In mm at widest point

4.1.11 OIB length

In mm

4.1.12 OIB attitude

- 1 Close
- 2 Open

4.1.13 Bracts enclosing head

- 1 Incomplete
- 2 Complete

4.1.14 Number of spines on OIB

- 0 None
- 3 Few
- 5 Intermediate
- 7 Many

4.1.15 Location of spines on OIB

- 1 Tip only
- 2 Tip and few apical
- 3 Tip and few basal
- 4 Tip and all along margins
- 5 Margins only

4.1.16 Head (capitulum) shape

Primary head shape before flowering (see Fig. 3)

- 1 Conical
- 2 Oval
- 3 Flattened

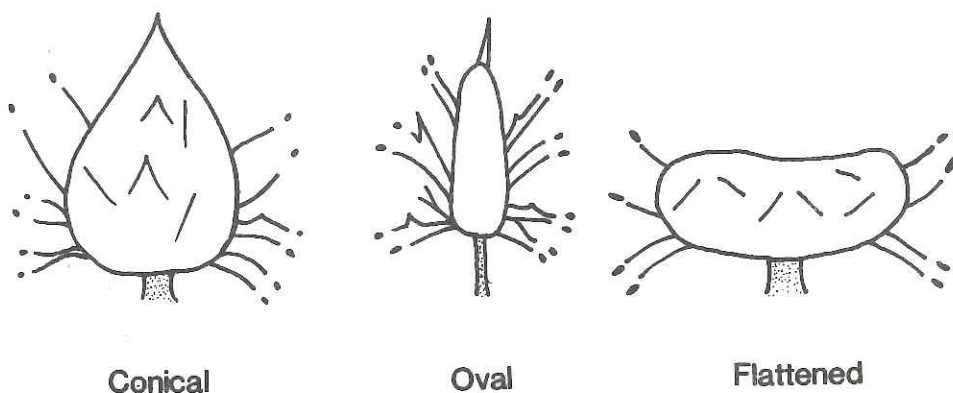


Fig. 3. Head (capitulum shape)

4.1.17 Diameter of primary head

At maturity in mm measured at base

4.2 FLOWER AND FRUIT

4.2.1 Corolla colour in bloom

- 1 White
- 2 Pale yellow
- 3 Light yellow
- 4 Yellow
- 5 Light orange base
- 6 Yellow, base and tips of lobes orange
- 7 Red-orange
- 8 Pink
- 9 Purple
- 10 Other (specify in the NOTES descriptor, 11)

4.2.2 Corolla colour of dry flower

- 1 Grey-white
- 2 Pale yellow
- 3 Yellow
- 4 Light orange
- 5 Orange base
- 6 Orange
- 7 Deep red
- 8 Other (specify in the NOTES descriptor, 11)

4.2.3 Pollen production

Amount of pollen produced before bee activity in the morning or in the bagged heads

- 3 Sparse
- 5 Intermediate
- 7 Abundant

4.3 SEED

4.3.1 Seed colour

- 1 White
- 2 Cream
- 3 Brown
- 4 Black
- 5 Grey
- 6 Other (specify in the NOTES descriptor, 11)

4.3.2 Seed hull thickness

- 0 Hull absent
- 1 Thin
- 2 Normal
- 3 Think
- 4 Other (specify in the NOTES descriptor, 11)

4.3.3 Seed size

- 3 Small
- 5 Intermediate
- 7 Large

4.3.4 Seed shape
See Fig. 4

- 1 Oval
- 2 Conical
- 3 Crescent



Fig. 4. Seed shape

4.3.5 Pappus

- 0 Absent
- + Present

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 HARVEST DATE
 - 5.5.1 Day
 - 5.5.2 Month
 - 5.5.3 Year

6. PLANT DATA

6.1 VEGETATIVE

6.1.1 Days to Emergence

Number of days from planting or first irrigation to 50% seedling emergence

6.1.2 Growth habit

- 1 Erect
- 2 Bushy

6.1.3 Length of branches

- 0 No branches
- 3 Short
- 5 Intermediate
- 7 Long

6.1.4 Stem colour

- 1 White
- 2 Green
- 3 Other (specify in the NOTES descriptor, 11)

6.1.5 Leaf texture

- 1 fleshy
- 2 Normal
- 3 Leathery

6.1.6 Shape of Outer Involucral Bracts (OIB) in cross-section

See Fig. 5

- 1 Flat
- 2 Grooved



Flat



Grooved

Fig. 5. Shape of OIB in cross-section

6.1.7 Length of spines on OIB

- 0 No spines
- 3 Short
- 5 Intermediate
- 7 Long

6.1.8 OIB spine colour

- 0 No spines
- 1 Whitish
- 2 Yellowish
- 3 Greenish
- 4 Other (specify in the NOTES descriptor, 11)

6.1.9 Days to physiological maturity

Number of days to 75% of plants reaching physiological maturity from date of planting or first irrigation

6.1.10 Plant height

Mean (in cms) of 5 random plants from the middle of the plot

6.1.11 Head (capitulum) number

Per plant

6.1.12 Uniformity of maturation

- 1 Uniform
- 2 Varying

6.2 FLOWER AND FRUIT

6.2.1 Days to 50% flowering

Number of days from planting or first irrigation to 50% of plants having first flower

6.2.2 Corolla colour at bud stage

- 1 White
- 2 Pale yellow
- 3 Light yellow
- 4 Yellow
- 5 Yellow, base and tips of lobes orange
- 6 Deep red
- 7 Pink
- 8 Purple
- 9 Other (specify in the NOTES descriptor, 11)

6.2.3 Pollen colour

- 1 White
- 2 Yellow

6.3 SEED

6.3.1 Seed shattering at harvest

- 3 Low shattering
- 5 Intermediate
- 7 High shattering

6.3.2 Seed number

Per primary head

6.3.3 Yield per plot

In g per m²

6.3.4 Yield per plant

Mean (in g) of 5 random plants from the middle of the plot

6.3.5 1000 seed weight

In g at 6% moisture content

6.3.6 Hull percentage

At 6% moisture content

6.3.7 Oil content

In percent

6.3.8 Iodine value of oil

6.3.9 Fatty acid pattern, % of

- 1 Palmitic
- 2 Stearic
- 3 Oleic
- 4 Linoleic
- 5 Other (specify in the NOTES descriptor, 11)

6.3.10 Protein content, in %

Of whole seed

6.3.11 Seed dormancy

- 1 Absent
- 2 Present

7. STRESS SUSCEPTIBILITY

Scored on a scale 1-9 where:

- 3 Low susceptibility
- 5 Medium susceptibility
- 7 High susceptibility

7.1 LOW TEMPERATURE

7.2 HIGH TEMPERATURE

7.3 DROUGHT

7.4 HIGH SOIL MOISTURE

7.5 SALINITY

7.6 LODGING

8. PEST AND DISEASE SUSCEPTIBILITY

Scored on a scale 1-9, with pest or disease specified where:

- 3 Low susceptibility
- 5 Medium susceptibility
- 7 High susceptibility

8.1 PESTS

- | | | |
|--------|---|-----------------------|
| 8.1.1 | <u>Myzus persicae</u> (Sulzer) | Green peach aphid |
| 8.1.2 | <u>Aphis fabae</u> Scop. | Black bean aphid |
| 8.1.3 | <u>Aphis helichrysi</u> Kaltenback | Leaf-curl plum aphid |
| 8.1.4 | <u>Lygus hesperus</u> Knight | Lygus bug |
| 8.1.5 | <u>Frankliniella occidentalis</u> Perg. | Western flower thrip |
| 8.1.6 | <u>Trichoplusia ni</u> Hbn. | Looper |
| 8.1.7 | <u>Homoeosoma electellum</u> (Hulst.) | Sunflower moth larvae |
| 8.1.8 | <u>Melanogromyza virens</u> (Loew) | Stem miner |
| 8.1.9 | <u>Tebranychus urticae</u> (K)
<u>T. pacificus</u> McGregor | Red spider mite |
| 8.1.10 | <u>Chlorochroa sayi</u> Stol.
<u>Euschistus conspersus</u> Uhler. | Stink bug |
| 8.1.11 | <u>Liriomyza</u> spp. | Leaf miner |
| 8.1.12 | <u>Melanoplus</u> & <u>Schistocera</u> spp. | Grasshopper |
| 8.1.13 | <u>Limoni</u> spp. | Wireworm |
| 8.1.14 | <u>Empoasca filamenta</u> DeLong
<u>E. abrupta</u> DeLong | Leafhopper |
| 8.1.15 | <u>Acanthophilus helianthi</u> R.
<u>Chaetorellia jaceae</u> R.D.
<u>Euribia</u> Meig. spp. | Safflower fly |
| 8.1.16 | <u>Meloidogyne incognita acuta</u> ,
<u>M. javanica javanica</u> | Root knot |

8.2 FUNGI

- | | | |
|-------|---|-------------------|
| 8.2.1 | <u>Puccinia carthami</u> Cda. | Rust |
| 8.2.2 | <u>Fusarium oxysporum</u> Schlecht.
f. sp. <u>carthami</u> Klis. and Hous. | Fusarium wilt |
| 8.2.3 | <u>Verticillium dahliae</u> Kleb. | Verticillium wilt |

- | | | |
|--------|---|---|
| 8.2.4 | <u>Phytophthora dreghsleri</u> Tucker, <u>Phytophthora</u>
<u>P. parasitica</u> Dast., <u>P</u>
<u>cryptogea</u> Pethyb. and Laff.,
<u>P. cactorum</u> (Leb. and Cohn)
Schroet., <u>P. megasperma</u>
Drechs. other <u>Phytophthora</u> spp. | root and stem rot |
| 8.2.5 | <u>Pythium splendens</u> Braun., <u>P.</u>
<u>ultimum</u> Trow, <u>P. aphanider-</u>
<u>matum</u> (Edson) Fitz. | Pythium root rot |
| 8.2.6 | <u>Alternaria carthami</u> Chowd. | Alternaria leaf
spot |
| 8.2.7 | <u>Sclerotinia sclerotiorum</u> (Lib.)
DeBary | Sclerotinia wilt
and head rot |
| 8.2.8 | <u>Botrytis cinerea</u> Pers. ex Fries | Botrytis head rot |
| 8.2.9 | <u>Macrophomina phaseoli</u> (Tassi)
Goid | Charcoal rot |
| 8.2.10 | <u>Erysiphe cichoracearum</u> DC. | Powdery mildew |
| 8.2.11 | <u>Cercospora</u> spp. | Cercospora
leafspot |
| 8.2.12 | <u>Rhizoctonia solani</u> Kuhn | Rhizoctonia blight |
| 8.3 | BACTERIA | |
| 8.3.1 | <u>Pseudomonas syringae</u> van Hall | Bacterial leaf
spot and stem
blight |
| 8.4 | VIRUS AND MYCOPLASMA | |
| 8.4.1 | <u>Mosaic</u> | Lettuce mosaic
virus, alfalfa
mosaic virus,
turnip mosaic
virus, cucumber
mosaic virus |
| 8.4.2 | <u>Systemic necrosis</u> | Lettuce mosaic
virus, turnip
mosaic virus |
| 8.4.3 | <u>Phyllody</u> | Mycoplasma |

9. ALLOENZYME COMPOSITION AND ZYMOTYPE

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

10. CYTOLOGICAL CHARACTERS AND IDENTIFIED GENES

11. NOTES

Give additional information where descriptor state is noted as 'Other' as, for example, in descriptors 2.10, 4.2.1, etc. Also include here any further relevant information.



APPENDIX

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