DESCRIPTORS FOR RYE AND TRITICALE

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INTERNATIONAL BOARD FOR PLANT GENETIC RESOURCES

DESCRIPTORS FOR RYE AND TRITICALE

IBPGR Secretariat
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The International Board for Plant Genetic Resources (IBPGR) is an autonomous international scientific organization under the aegis of the Consultative Group on International Agricultural Research (CGIAR). The IBPGR was established by the CGIAR in 1974 and its Executive Secretariat is provided by the Food and Agriculture Organization of the United Nations. The basic function of the IBPGR is to promote and coordinate an international network of genetic resources centres to further the collection, conservation, documentation, evaluation and use of plant germplasm and thereby contribute to raising the standard of living and welfare of people throughout the world. The Consultative Group mobilizes financial support from its members to meet the budgetary requirements of the Board.

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PREFACE

Although a minor crop on a world scale, rye (Secale spp.) is important in many countries of central and eastern Europe. Triticale, a wheat by rye hybrid, is potentially of very great importance over much of the world, often capable of outyielding wheat. It is therefore appropriate for a descriptor list covering these two crops to be produced, in order to help standarize the information available to breeders.

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

DESCRIPTOR LIST FOR RYE AND TRITICALE

The 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 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 according to the SI system. The units to be applied are given in square brackets following the descriptor;

(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 Section 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, 0 would be scored for the following descriptor

Flower colour

1 White
2 Yellow
3 Red
4 Purple

(f) blanks are used for information not yet available;

(g) standard colour charts, e.g. Royal Horticultural Society Colour Chart, Methuen Handbook of Colour, Munsell Color Charts for Plant Tissues are strongly recommended for all ungraded colour characters (the precise chart used should be specified in the NOTES descriptor, 11);

(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

This number serves as a unique identifier for accessions and is assigned by the curator when an accession is entered into his collection. Once assigned this number should never be reassigned to another accession in the collection. Even if an accession is lost, its assigned number is still not available for re-use. Letters should occur before the number to identify the genebank or national system (e.g. MG indicates an accession comes from the genebank at Bari, Italy; PI indicates an accession within the USA system)

1.2 DONOR NAME

Name of institution or individual responsible for donating the germplasm

1.3 DONOR IDENTIFICATION NUMBER

Number assigned to accession by the donor

1.4 OTHER NUMBERS ASSOCIATED WITH THE ACCESSION (other numbers can be added as 1.4.3 etc.)

Any other identification number known to exist in other collections for this accession, e.g. USDA Plant Inventory number (not collection number, see 2.1)

1.4.1 Other number 1

1.4.2 Other number 2

1.5 SCIENTIFIC NAME

1.5.1 Genus

1.5.2 Species

1.5.3 Subspecies

1.5.4 Botanical variety (convariety)

1.6 PEDIGREE/CULTIVAR NAME

Nomenclature and designations assigned to breeder's material

1.7 ACQUISITION DATE

The date in which the accession entered the collection

1.8 DATE OF LAST REGENERATION OR MULTIPLICATION

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 sub-samples wherever they are sent

2.2 COLLECTING INSTITUTE

Institute or person collecting/sponsoring the original sample

2.3 DATE OF COLLECTION OF ORIGINAL SAMPLE

2.4 COUNTRY OF COLLECTION OR COUNTRY WHERE CULTIVAR/VARIETY BRED

Use the 3 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. TIMBUKTU 7S 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 [m]

Elevation above sea level

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 Breeder's 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

2.17 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

3. SITE DATA

3.1 COUNTRY OF CHARACTERIZATION AND PRELIMINARY EVALUATION

3.2 SITE (RESEARCH INSTITUTE)

3.3 NAME OF PERSON(S) IN CHARGE OF CHARACTERIZATION

3.4 SOWING DATE

3.5 HARVEST DATE

4. PLANT DATA

4.1 VEGETATIVE

4.1.1 Growth class (seasonality)

1 Winter
2 Facultative (intermediate)
3 Spring

4.1.2 Plant height [cm]

Height of plant at maturity, measured from ground to top of spike, excluding awns

4.2 INFLORESCENCE

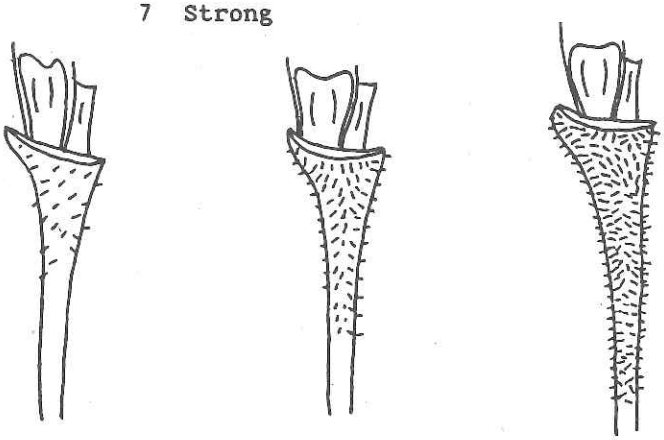
4.2.1 Days to ear emergence

Counted as days from sowing to when 50% of plants have ears emerged. However, when planting in dry soils in dryland areas it is counted from the first day of rainfall or irrigation which is sufficient for germination

4.2.2 Stem hairiness below ear

See Fig. 1

0 Absent
3 Weak
5 Intermediate
7 Strong



3 Weak 5 Intermediate 7 Strong

Fig.1 Stem hairiness below ear

4.2.3 Length of spike [cm]

Average length (without awns) of 5 typical spikes selected from a growing accession. Measured at maturity

4.2.4 Length of awns

Estimated at maturity on a 1-9 scale, where

0 Awnless
3 Short awns
7 Conspicuous awns

4.2.5 Number of spikelets per spike

The average number of spikelets per spike from 5 spikes selected from a growing accession

4.2.6 Shattering

Fragility of rachis in mature spike

0 Non-fragile
3 Weak shattering (upper 1/3 disintegrates)
5 Medium shattering (1/2 - 1/3 disintegrates)
7 Complete shattering (whole spike disintegrates)

4.3 SEED

4.3.1 Seed colour

1 White
2 Grey
3 Green
4 Brown
5 Purple
6 Other (specify in the NOTES descriptor, 11)

4.3.2 Seed shape

See Fig. 2

1 Ovate
2 Ovate-oblong
3 Barrel-shaped
4 Compressed on each side
5 Other (specify in the NOTES descriptor, 11)

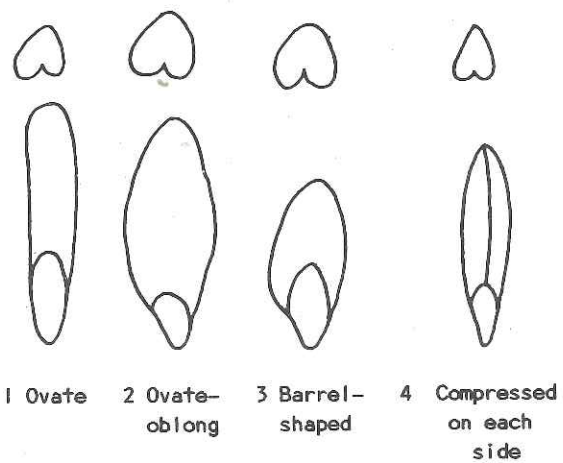


Fig. 2 Seed shape

4.3.3 1000 grain weight [g]

4.3.4 Seed vitreousness

Glass-like appearance when seeds are transversely sectioned

0 Not vitreous (soft)
5 Partly vitreous
7 Vitreous

FURTHER CHARACTERIZATION AND EVALUATION

Many of the descriptors below are included in "The International COMECON [1/] List of Descriptors for the Genus Secale L.". Evaluating for all these characters is beyond the resources of many collections; the characters are included here solely as a guide to what might be done. For the general principles of scoring characters not covered here see pp. 1 and 2

5. SITE DATA

5.1 COUNTRY OF FURTHER CHARACTERIZATION AND EVALUATION

5.2 SITE (RESEARCH INSTITUTE)

5.3 NAME OF PERSON(S) IN CHARGE OF EVALUATION

5.4 SOWING DATE

5.5 HARVEST DATE

6. PLANT DATA

6.1 VEGETATIVE

6.1.1 Growth habit of young plant

Appearance during tillering, but before jointing

3 Upright
7 Prostrate

6.1.2 Vernalization requirement (winter types only)

Length of cold period required to induce flowering later in season

3 Low
7 High

6.1.3 Tillering capacity

Subjective assessment of number of tillers per plant at low densities

3 Low
7 High

1/ COMECON: Council for Mutual Economic Assistance

6.2 INFLORESCENCE

6.3 SEED

6.3.1 Pre-harvest sprouting tendency

Tendency of grains to sprout in the ear as a result of high moisture near harvest. Recorded on a 1-9 scale

0 No sprouting
3 Low sprouting
7 High sprouting

6.3.2 Degree of seed shrivelling

Appearance of dry seed after harvest

3 Plump
5 Intermediate
7 Shrivelled

6.3.3 Protein content [%]

Measured as percentage of dry weight (seed moisture equal to or less than 12%). Indicate (in the NOTES descriptor, 11) the conversion factor used as either N x 6.25 or N x 5.6

6.3.4 Lysine [%]

Percentage of lysine per unit of protein (absolute)

6.3.5 Flour colour

3 Light
7 Dark

6.3.6 Quality in food processing

Suitability in making the products listed below

3 Good
7 Poor

6.3.6.1 Bread

6.3.6.2 Crispbread

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

7.1.1 Winter susceptibility

Measured as a loss of plants in a sowing

7.1.2 Cold susceptibility

Damage caused by cold to aerial parts of plants; not associated with death of plants in winter

7.2 EXCESS SOIL MOISTURE

7.3 DROUGHT

7.4 SOIL ACIDITY

7.5 HIGH SOLUBLE ALUMINIUM

7.6 LOW NITROGEN

7.7 LODGING

8. PEST AND DISEASE SUSCEPTIBILITY

In each case it is important to state the origin of the infestation or infection, i.e., natural, field inoculation, laboratory test (specify). Indicate if information on physiological specialization is available. Record such information in the NOTES descriptor, 11. Other organisms may be added using a similar coding system

These are coded on a 1-9 scale, where

3 Low susceptibility
5 Medium susceptibility
7 High susceptibility

8.1 PESTS

8.1.1	Nematode spp.	
8.1.2	Frit fly	Oscinella frit
8.1.3	Other (specify in the NOTES descriptor, 11)	

8.2 FUNGI

8.2.1	Stem rust	Puccinia graminis
8.2.2	Brown rust	Puccinia dispersa
8.2.3	Powdery mildew	Erysiphe graminis
8.2.4	Eye spot	Cercosporella herpotrichoides
8.2.5	Snow mould	Fusarium nivale
8.2.6	Scab	Fusarium graminiarum
8.2.7		Fusarium culmorum
8.2.8	Other (specify in the NOTES descriptor, 11)	

8.3 BACTERIA

8.4 VIRUSES AND MYCOPLASMA

9. GEL ELECTROPHORETIC PATTERNS AND ALLOENZYME COMPOSITION

These may be useful tools for monitoring grain quality aspects and for identifying duplicate accessions

10. CYTOLOGICAL CHARACTERISTICS AND IDENTIFIED GENES

Include here notes on the genomic composition of Triticale material

11. NOTES

Give additional information where descriptor state is noted as 'Other' as, for example, in descriptors 2.10 and 8. Also include here any further relevant information

APPENDIX I

LIST OF EXPERTS CONSULTED

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