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# INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

**TRITICALE**

UPOV Code(s):

TRITL

×*Triticosecale* Witt.

*

**GUIDELINES**

**FOR THE CONDUCT OF TESTS**

**FOR DISTINCTNESS, UNIFORMITY AND STABILITY**

*prepared by experts from Australia*
*to be considered by the*
*Technical Working Party for Agricultural Crops*
*at its forty-seventh session, to be held in Naivasha, Kenya,*
*from 2018-05-21 to 2018-05-25*

*Disclaimer: this document does not represent UPOV policies or guidance*

Alternative names:*

| *Botanical name* | *English* | *French* | *German* | *Spanish* |
|---|---|---|---|---|
| ×*Triticosecale* Witt. | Triticale | Triticale | Triticale | Triticale |

The purpose of these guidelines ("Test Guidelines") is to elaborate the principles contained in the General Introduction (document TG/1/3), and its associated TGP documents, into detailed practical guidance for the harmonized examination of distinctness, uniformity and stability (DUS) and, in particular, to identify appropriate characteristics for the examination of DUS and production of harmonized variety descriptions.

## ASSOCIATED DOCUMENTS

These Test Guidelines should be read in conjunction with the General Introduction and its associated TGP documents.

* These names were correct at the time of the introduction of these Test Guidelines but may be revised or updated. [Readers are advised to consult the UPOV Code, which can be found on the UPOV Website (www.upov.int), for the latest information.]

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1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of ×*Triticosecale* Witt..

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.

2.2 The material is to be supplied in the form of seeds and ears (if requested).

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

Seeds: 3 kg
Ears (if requested): 200

The seed should meet the minimum requirements for germination, species and analytical purity, health and moisture content, specified by the competent authority. In cases where the seed is to be stored, the germination capacity should be as high as possible and should, be stated by the applicant.

The ear should be well developed and should contain a sufficient number of viable seeds to establish a satisfactory row of plants for observation.

2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.

2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

*3.1 Number of Growing Cycles*

The minimum duration of tests should normally be two independent growing cycles.

*3.2 Testing Place*

Tests are normally conducted at one place. In the case of tests conducted at more than one place, guidance is provided in TGP/9 “Examining Distinctness”.

*3.3 Conditions for Conducting the Examination*

3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.

3.3.2 The optimum stage of development for the assessment of each characteristic is indicated by a number in the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.

*3.4 Test Design*

3.4.1 Each test should be designed to result in a total of at least 2000 plants, which should be divided between at least 2 replicates.

3.4.2 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.

3.4.3 If tests on ear rows are conducted, at least 100 ear rows should be observed.
The assessment of the characteristic "Seasonal type" should be carried out on at least 300 plants.

*3.5 Additional Tests*

Additional tests, for examining relevant characteristics, may be established.

## 4. Assessment of Distinctness, Uniformity and Stability

*4.1 Distinctness*

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding distinctness. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

To assess distinctness of hybrids, the parent lines and the formula may be used according to the following recommendations:

(i) description of parent lines according to the Test Guidelines;

(ii) check of the originality of the parent lines in comparison with the variety collection, based on the characteristics in Chapter 7, in order to identify similar parent lines;

(iii) check of the originality of the hybrid formula in relation to the hybrids in the variety collection, taking into account the most similar lines; and

(iv) assessment of the distinctness at the hybrid level for varieties with a similar formula.

Further guidance is provided in documents TGP/9 "Examining Distinctness" and TGP/8 "Trial Design and Techniques Used in the Examination of Distinctness, Uniformity and Stability".

4.1.2 Consistent Differences

The differences observed between varieties may be so clear that more than one growing cycle is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than a single growing cycle is required to provide assurance that the differences observed between varieties are sufficiently consistent. One means of ensuring that a difference in a characteristic, observed in a growing trial, is sufficiently consistent is to examine the characteristic in at least two independent growing cycles.

4.1.3 Clear Differences

Determining whether a difference between two varieties is clear depends on many factors, and should consider, in particular, the type of expression of the characteristic being examined, i.e. whether it is expressed in a qualitative, quantitative, or pseudo-qualitative manner. Therefore, it is important that users of these Test Guidelines are familiar with the recommendations contained in the General Introduction prior to making decisions regarding distinctness.

4.1.4 Number of Plants or Parts of Plants to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single plants should be made on 10 plants or parts of plants taken from each of 10 plants and any other observations made on all plants in the test, disregarding any off-type plants.

In the case of observations of parts taken from single plants, the number of parts to be taken from each of the plants should be 1.

4.1.5 Method of Observation

The recommended method of observing the characteristic for the purposes of distinctness is indicated by the following key in the Table of Characteristics (see document TGP/9 “Examining Distinctness”, Section 4 “Observation of characteristics”):

MG: single measurement of a group of plants or parts of plants
MS: measurement of a number of individual plants or parts of plants
VG: visual assessment by a single observation of a group of plants or parts of plants
VS: visual assessment by observation of individual plants or parts of plants

Type of observation: visual (V) or measurement (M)

"Visual" observation (V) is an observation made on the basis of the expert's judgment. For the purposes of this document, "visual" observation refers to the sensory observations of the experts and, therefore, also includes smell, taste and touch. Visual observation includes observations where the expert uses reference points (e.g. diagrams, example varieties, side-by-side comparison) or non-linear charts (e.g. color charts). Measurement (M) is an objective observation against a calibrated, linear scale e.g. using a ruler, weighing scales, colorimeter, dates, counts, etc.

Type of record: for a group of plants (G) or for single, individual plants (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of plants or parts of plants (G), or may be recorded as records for a number of single, individual plants or parts of plants (S). In most cases, "G" provides a single record per variety and it is not possible or necessary to apply statistical methods in a plant-by-plant analysis for the assessment of distinctness.

In cases where more than one method of observing the characteristic is indicated in the Table of Characteristics (e.g. VG/MG), guidance on selecting an appropriate method is provided in document TGP/9, Section 4.2.

*4.2 Uniformity*

4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:

4.2.2 These Test Guidelines have been developed for the examination of self-pollinated varieties. For varieties with other types of propagation, the recommendations in the General Introduction and document TGP/13 "Guidance for new types and species" Section 4.5 "Testing Uniformity" should be followed.

4.2.3 The assessment of uniformity for hybrid varieties depends on the type of hybrid and should be according to the recommendations for hybrid varieties in the General Introduction.

4.2.4 Where the assessment of a hybrid variety involves the parent lines, the uniformity of the hybrid variety should, in addition to an examination of the hybrid variety itself, also be assessed by examination of the uniformity of its parent lines.

4.2.5 The recommended sample size for the assessment of uniformity is indicated by the following key in the table of characteristics:

A sample size of 100 plants/parts of plants
B sample size of 2000 plants or parts of plants

4.2.6 For the assessment of uniformity of self-pollinated varieties, a population standard of 0.6% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 2000 plants, 18 off-types are allowed.

4.2.7 For the assessment of uniformity in a sample of 100 ear-rows, plants or parts of plants, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 100 ear-rows, plants or parts of plants, 3 off-types are allowed. An ear-row is considered to be an off-type ear-row if there is more than 1 off-type plant within that ear-row.

For "A" characteristics, with the exception of characteristic 2 and 3, the assessment of uniformity can be done in 2 steps. In a first step, 20 plants are observed. If no off-types are observed, the variety is considered to be uniform. If more than 3 off-types are observed, the variety is considered not to be uniform. If 1 to 3 off-types are observed, an additional sample of 80 plants or parts of plants must be observed.

For the assessment of uniformity of hybrid varieties, a population standard of 10% and an acceptance probability of at least 95% should be applied. In case of characteristics indicated by B, the sample size for the assessment of uniformity may be reduced to 200 plants. In case of a sample size of 200 plants, 27 off-types are allowed. In case of a sample size of 100 ear-rows, plants or parts of plants, 15 off-types are allowed.

*4.3 Stability*

4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.

4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new seed stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

4.3.3 Where appropriate, or in cases of doubt, the stability of a hybrid variety may, in addition to an examination of the hybrid variety itself, also be assessed by examination of the uniformity and stability of its parent lines.

## 5. Grouping of Varieties and Organization of the Growing Trial

5.1 The selection of varieties of common knowledge to be grown in the trial with the candidate varieties and the way in which these varieties are divided into groups to facilitate the assessment of distinctness are aided by the use of grouping characteristics.

5.2 Grouping characteristics are those in which the documented states of expression, even where produced at different locations, can be used, either individually or in combination with other such characteristics: (a) to select varieties of common knowledge that can be excluded from the growing trial used for examination of distinctness; and (b) to organize the growing trial so that similar varieties are grouped together.

5.3 The following have been agreed as useful grouping characteristics:

(a) Time of ear emergence (characteristic 5)
(b) Lower glume: hairiness on external surface (characteristic 16)
(c) Ear: color (characteristic 18)
(d) Seasonal type (characteristic 25)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction and document TGP/9 "Examining Distinctness".

## 6. Introduction to the Table of Characteristics

### *6.1 Categories of Characteristics*

#### 6.1.1 Standard Test Guidelines Characteristics

Standard Test Guidelines characteristics are those which are approved by UPOV for examination of DUS and from which members of the Union can select those suitable for their particular circumstances.

#### 6.1.2 Asterisked Characteristics

Asterisked characteristics (denoted by *) are those included in the Test Guidelines which are important for the international harmonization of variety descriptions and should always be examined for DUS and included in the variety description by all members of the Union, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

### *6.2 States of Expression and Corresponding Notes*

6.2.1 States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.2.2 In the case of qualitative and pseudo-qualitative characteristics (see Chapter 6.3), all relevant states of expression are presented in the characteristic. However, in the case of quantitative characteristics with 5 or more states, an abbreviated scale may be used to minimize the size of the Table of Characteristics. For example, in the case of a quantitative characteristic with 9 states, the presentation of states of expression in the Test Guidelines may be abbreviated as follows:

| *State* | *Note* |
|---|---|
| small | 3 |
| medium | 5 |
| large | 7 |

However, it should be noted that all of the following 9 states of expression exist to describe varieties and should be used as appropriate:

| *State* | *Note* |
|---|---|
| very small | 1 |
| very small to small | 2 |
| small | 3 |
| small to medium | 4 |
| medium | 5 |
| medium to large | 6 |
| large | 7 |
| large to very large | 8 |
| very large | 9 |

6.2.3 Further explanation of the presentation of states of expression and notes is provided in document TGP/7 “Development of Test Guidelines”.

### *6.3 Types of Expression*

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the General Introduction.

### *6.4 Example Varieties*

Where appropriate, example varieties are provided to clarify the states of expression of each characteristic.

*6.5 Legend*

| | | English | | français | | deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | | | |
| | | **Name of characteristics in English** | | **Nom du caractère en français** | | **Name des Merkmals auf Deutsch** | **Nombre del carácter en español** | | |
| | | states of expression | | types d'expression | | Ausprägungsstufen | tipos de expresión | | |

1 Characteristic number

2 (*) Asterisked characteristic – see Chapter 6.1.2

3 Type of expression
QL Qualitative characteristic – see Chapter 6.3
QN Quantitative characteristic – see Chapter 6.3
PQ Pseudo-qualitative characteristic – see Chapter 6.3

4 Method of observation (and type of plot, if applicable)
MG, MS, VG, VS – see Chapter 4.1.5

5 (+) See Explanations on the Table of Characteristics in Chapter 8.1

6 Not applicable

7 Growth stage key See Explanations on the Table of Characteristics in Chapter 8

A sample size of 100 plants/parts of plants
B sample size of 2000 plants or parts of plants

## 7. Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de caracteres

| | English | français | deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|
| **1.** | **QN VG\|A** | **(+)** | **9-11** | | | |
| | **Coleoptile: anthocyanin coloration** | | | | | |
| | absent or very weak | | | | Coral Sea | 1 |
| | weak | | | | Yowie | 3 |
| | medium | | | | Tickit | 5 |
| | strong | | | | | 7 |
| | very strong | | | | | 9 |
| **2.** | **QN VG\|B** | **(+)** | **25-29** | | | |
| | **Plant: growth habit** | | | | | |
| | erect | | | | Prime 322 | 1 |
| | semi-erect | | | | Crackerjack | 3 |
| | intermediate | | | | Chopper | 5 |
| | semi-prostrate | | | | Forerunner | 7 |
| | prostrate | | | | Tobruk | 9 |
| **3.** | **QN VG\|B** | **(+)** | **47-51** | | | |
| | **Plant: frequency of plants with recurved flag leaves** | | | | | |
| | absent or very low | | | | Tuckerbox | 1 |
| | low | | | | Crackerjack | 3 |
| | medium | | | | Austute | 5 |
| | high | | | | Forerunner | 7 |
| | very high | | | | Madonna | 9 |
| **4.** | **QN VG\|A** | **(+)** | **47-51** | | | |
| | **Flag leaf: anthocyanin coloration of auricles** | | | | | |
| | absent or weak | | | | Austute | 1 |
| | weak | | | | Hawkeye | 3 |
| | medium | | | | Coral Sea | 5 |
| | strong | | | | Heritage Zephyr | 7 |
| | Very strong | | | | Crackerjack 2 | 9 |

| | | English | français | deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **5.** | **(*)** | **QN MG\|B** | **(+)** | | | | |
| | | **Time of ear emergence** | | | | | |
| | | very early | | | | Chopper | 1 |
| | | early | | | | Prime 322 | 3 |
| | | medium | | | | Coral Sea | 5 |
| | | late | | | | Crackerjack | 7 |
| | | very late | | | | Pacific Falcon | 9 |
| **6.** | | **QN VG\|B** | | **55-65** | | | |
| | | **Flag leaf: glaucosity of sheath** | | | | | |
| | | absent or very weak | | | | Tobruk | 1 |
| | | weak | | | | Endeavour | 3 |
| | | medium | | | | Forerunner | 5 |
| | | strong | | | | Tickit | 7 |
| | | very strong | | | | Heritage Zephyr | 9 |
| **7.** | | **QN VG\|B** | | **65** | | | |
| | | **Anther: anthocyanin coloration** | | | | | |
| | | absent or very weak | | | | Tobruk | 1 |
| | | weak | | | | | 2 |
| | | strong | | | | Maiden | 3 |
| **8.** | **(*)** | **QN VG\|A** | | **80-92** | | | |
| | | **Awn: anthocyanin coloration** | | | | | |
| | | absent or very weak | | | | Crackerjack | 1 |
| | | weak | | | | Fusion | 2 |
| | | medium | | | | Yowie | 3 |
| | | strong | | | | | 4 |
| | | very strong | | | | | 5 |
| **9.** | | **QN MS\|A** | | **60-69** | | | |
| | | **Flag leaf: length of blade** | | | | | |
| | | short | | | | Crackerjack | 3 |
| | | medium | | | | Chopper | 5 |
| | | long | | | | Endeavour | 7 |

| | | English | français | deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **10.** | | **QN MS\|A** | | **60-69** | | | |
| | | **Flag leaf: width of blade** | | | | | |
| | | narrow | | | | Tobruk | 3 |
| | | medium | | | | Yowie | 5 |
| | | broad | | | | Chopper | 7 |
| **11.** | **(*)** | **QN VG\|B** | **(+)** | **60-69** | | | |
| | | **Stem: density of hairiness of neck** | | | | | |
| | | absent of very weak | | | | Maiden | 1 |
| | | weak | | | | Tuckerbox | 3 |
| | | medium | | | | Fusion | 5 |
| | | strong | | | | Austute | 7 |
| | | very strong | | | | Coral Sea | 9 |
| **12.** | | **QN VG\|B** | | **60-69** | | | |
| | | **Ear: glaucosity** | | | | | |
| | | absent or very weak | | | | Tobruk | 1 |
| | | weak | | | | Coral Sea | 3 |
| | | medium | | | | Hawkeye | 5 |
| | | strong | | | | Tuckerbox | 7 |
| | | very strong | | | | Chopper | 9 |
| **13.** | | **QN VG\|A** | **(+)** | **90-92** | | | |
| | | **Straw: pith in cross section** | | | | | |
| | | thin | | | | Chopper | 1 |
| | | medium | | | | Kosciuszko | 3 |
| | | thick | | | | | 5 |
| **14.** | **(*)** | **QN VG\|A** | **(+)** | **80-92** | | | |
| | | **Lower glume: length of first beak** | | | | | |
| | | very short | | | | | 1 |
| | | short | | | | Chopper | 3 |
| | | medium | | | | Tobruk | 5 |
| | | long | | | | Fusion | 7 |
| | | very long | | | | Treat | 9 |

| | | English | français | deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|
| **15.** | | **QN VG\|A** | **(+)** | **80-92** | | | |
| | | **Lower glume: size of second beak** | | | | | |
| | | absent or very small | | | | Treat | 1 |
| | | small | | | | Forerunner | 3 |
| | | medium | | | | | 5 |
| | | large | | | | Crackerjack 2 | 7 |
| | | very large | | | | | 9 |
| **16.** | **(*)** | **QL VG\|A** | | **80-92** | | | |
| | | **Lower glume: hairiness on external surface** | | | | | |
| | | absent | | | | Chopper | 1 |
| | | present | | | | Fusion | 9 |
| **17.** | **(*)** | **QN MG\|B** | **(+)** | **75-92** | | | |
| | | **Plant: length** | | | | | |
| | | very short | | | | | 1 |
| | | short | | | | Chopper | 3 |
| | | medium | | | | Endeavour | 5 |
| | | long | | | | Forerunner | 7 |
| | | very long | | | | | 9 |
| **18.** | **(*)** | **PQ VG\|B** | **(+)** | **90-92** | | | |
| | | **Ear: color** | | | | | |
| | | white | | | | Austute | 1 |
| | | slightly colored | | | | Forerunner | 2 |
| | | strongly colored | | | | | 3 |
| **19.** | | **QN MS\|A/VG\|A** | **(+)** | **90-92** | | | |
| | | **Ear: density** | | | | | |
| | | very lax | | | | | 1 |
| | | lax | | | | Treat | 3 |
| | | medium | | | | Coral Sea | 5 |
| | | dense | | | | Forerunner | 7 |
| | | very dense | | | | Tobruk | 9 |

| | | English | | français | | deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|---|---|
| **20.** | **(*)** | **QN** | **VG\|A** | **(+)** | | **80-92** | | | |
| | | **Ear: distribution of awns** | | | | | | | |
| | | tip awned | | | | | | | 1 |
| | | half awned | | | | | | Coral Sea | 2 |
| | | fully awned | | | | | | Austute | 3 |
| **21.** | | **QN** | **VG\|B** | | | **90-92** | | | |
| | | **Ear: width in profile view** | | | | | | | |
| | | very narrow | | | | | | | 1 |
| | | narrow | | | | | | Heritage Zephyr | 3 |
| | | medium | | | | | | Austute | 5 |
| | | broad | | | | | | Hillary | 7 |
| | | very broad | | | | | | | 9 |
| **22.** | **(*)** | **QN** | **MS\|A/VG\|A** | **(+)** | | **80-92** | | | |
| | | **Ear: length of scurs or awns** | | | | | | | |
| | | very short | | | | | | Forerunner | 1 |
| | | short | | | | | | Fusion | 3 |
| | | medium | | | | | | Tobruk | 5 |
| | | long | | | | | | Yowie | 7 |
| | | very long | | | | | | Maiden | 9 |
| **23.** | **(*)** | **QN** | **MS\|A/VG\|B** | **(+)** | | **90-92** | | | |
| | | **Ear: length** | | | | | | | |
| | | very short | | | | | | | 1 |
| | | short | | | | | | Crackerjack | 3 |
| | | medium | | | | | | Yowie | 5 |
| | | long | | | | | | Tuckerbox | 7 |
| | | very long | | | | | | | 9 |

| | | English | | français | | deutsch | español | Example Varieties<br>Exemples<br>Beispielssorten<br>Variedades ejemplo | Note/<br>Nota |
|---|---|---|---|---|---|---|---|---|---|
| **24.** | | **QN** | **VG\|A** | **(+)** | | **92** | | | |
| | | **Grain: coloration with phenol** | | | | | | | |
| | | absent or very light | | | | | | Coral Sea | 1 |
| | | light | | | | | | Tobruk | 3 |
| | | medium | | | | | | Tuckerbox | 5 |
| | | dark | | | | | | Credit | 7 |
| | | very dark | | | | | | Hawkeye | 9 |
| **25.** | **(*)** | **PQ** | **VG\|A** | **(+)** | | | | | |
| | | **Seasonal type** | | | | | | | |
| | | winter type | | | | | | Coral Sea | 1 |
| | | alternative type | | | | | | Breakwell | 2 |
| | | spring type | | | | | | Austute | 3 |

*8.1 Explanations for individual characteristics*

Ad. 1: Coleoptile: anthocyanin coloration

Method for the Determination of Anthocyanin Coloration
Number of seeds per test: 100 seeds
Preparation of seeds: Set up non-dormant seeds on moistened filter paper covered with a Petri dish lid during germination
Place: Laboratory or greenhouse
Light: After the coleoptiles have reached a length of about 1 cm in the dark, they are placed in artificial light (daylight equivalent) at 13000 to 15000 lux continuously for 3-4 days
Temperature: 15 to 20°C
Time of recording: Coleoptiles fully developed (about 1 week) at stage 09-11
Note: At least two example varieties should be included as a control
Any alternative method may be used if it gives the same results

Ad. 2: Plant: growth habit

The growth habit should be assessed visually from the attitude of the leaves and tillers at tillering stage (growth stages 25-29). The angle formed by the outer leaves and the tillers with an imaginary middle axis should be used.

1
erect

3
semi-erect

5
intermediate

7
semi-prostrate

9
prostrate

Ad. 3: Plant: frequency of plants with recurved flag leaves

1 (absent or very low): all or almost all flag leaves are rectilinear
3 (low): about 1/4 of the plants with recurved flag leaves
5 (medium): about 1/2 of the plants with recurved flag leaves
7 (high): about 3/4 of the plants with recurved flag leaves
9 (very high): almost all or all flag leaves are recurved

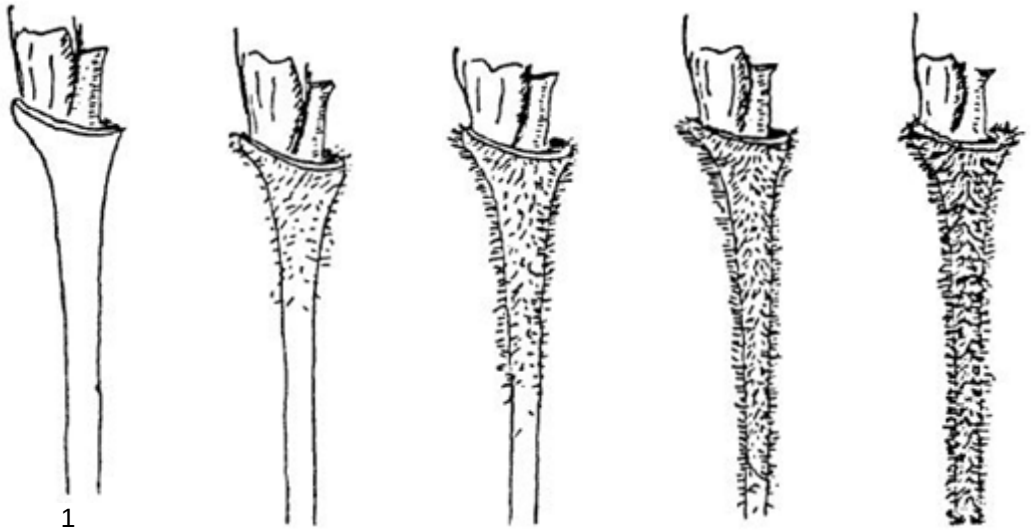
Ad. 4: Flag leaf: anthocyanin coloration of auricles

The appropriate scoring time between stages 49 and 60 should be determined depending on the location. All varieties should be assessed at the same stage

Ad. 5: Time of ear emergence

Time of ear emergence is reached when the first spikelet is visible on 50% of ears.

Ad. 11: Stem: density of hairiness of neck



1
absent of very weak

3
weak

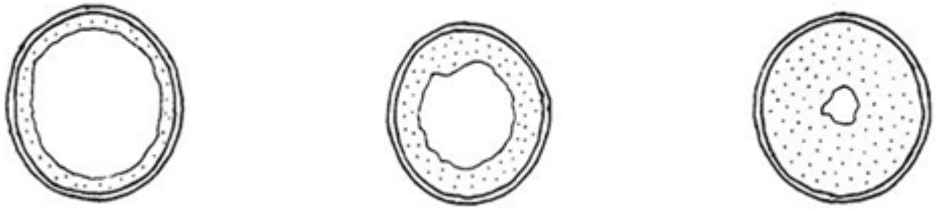
5
medium

7
strong

9
very strong

Ad. 13: Straw: pith in cross section

Pith in cross section should be observed half way between base of ear and uppermost node.
All stems of the plant should be checked and the highest score per plant recorded



1
thin

3
medium

5
thick

Ad. 14: Lower glume: length of first beak

1
very short

3
short

5
medium

7
long

9
very long

Ad. 15: Lower glume: size of second beak

1
absent or very small

3
small

5
medium

7
large

9
very large

Ad. 17: Plant: length

The length of plant includes stem, ear, awns and scurs

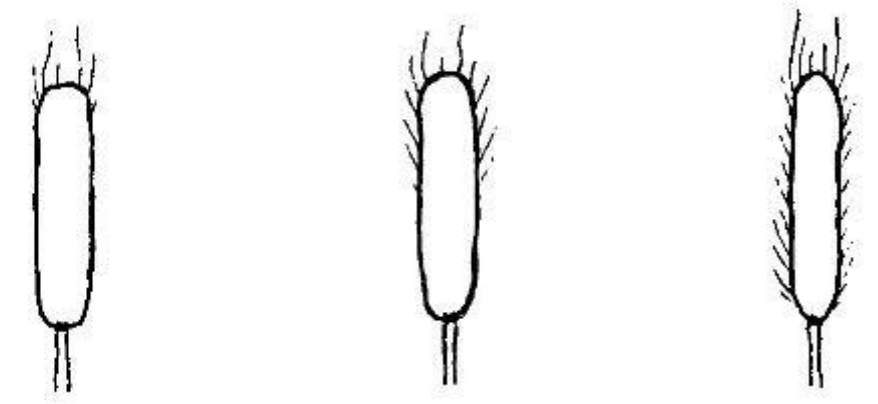
Ad. 18: Ear: color

White ear varieties may be slightly colored due to environmental conditions

Ad. 19: Ear: density

The density is the ratio of the number of spikelets per ear length

Ad. 20: Ear: distribution of awns



1
tip awned

2
half awned

3
fully awned

Ad. 22: Ear: length of scurs or awns

| 1 | 3 | 5 | 7 | 9 |
|---|---|---|---|---|
| very short | short | medium | long | very long |

Ad. 23: Ear: length

Length of ear should be observed excluding awns and scurs

Ad. 24: Grain: coloration with phenol

Method for Determination of Phenol Reaction:
Number of seeds per test: 100 seeds. The seeds should not have been treated chemically.
Preparation of seeds: Soak in tap water for 16 to 20 hours, drain and remove surface water, place the seeds with crease downwards, cover dish with lid
Concentration of solution: 1 per cent Phenol-solution (freshly made up)
Amount of solution: The seeds should be about 3/4 covered
Place: Laboratory
Light: Daylight - out of direct sunshine
Temperature: 18 to 20°C
Time of recording: 4 hours (after adding solution)
Note: At least two example varieties should be included as a control
Any alternative method may be used if it gives the same results

Ad. 25: Seasonal type

The seasonal type (need of vernalization) should be assessed on plots sown in springtime. Example varieties should always be included in the trial. When the example varieties behave according to their descriptions, candidate varieties can be described. At the time when the latest spring type variety is fully mature (stage 91/92 of the Zadoks decimal code) growth stage reached by the respective variety should be assessed. The states of expression are defined as follows:

1- Winter type (high need of vernalization): the plants have reached stage 45 of the Zadoks decimal code (boots swollen) at maximum.
2- Alternative type (partial need of vernalization): the plants have exceeded stage 45 of the Zadoks decimal code (they should have normally exceeded stage 75) and have reached stage 90 at maximum.
3- Spring type (no need or very weak need of vernalization): the plants have exceeded stage 90 of the Zadoks decimal code

*8.2 The descriptions of the growth stages of the Zadoks decimal code for cereals*

| Zadoks Decimal code | Description |
|---|---|
| 00 | Dry seed |
| 01 | Start of imbibition |
| 03 | Imbibition complete |
| 05 | Radicle emerged from seed |
| 07 | Coleoptile emerged from seed |
| 09 | Leaf just at coleoptile tip |
| 10 | First leaf through coleoptile |
| 11 | First leaf unfolded |
| 12 | 2 leaves unfolded |
| 13 | 3 leaves unfolded |
| 14 | 4 leaves unfolded |
| 15 | 5 leaves unfolded |
| 16 | 6 leaves unfolded |
| 17 | 7 leaves unfolded |
| 18 | 8 leaves unfolded |
| 19 | 9 or more leaves unfolded |
| 20 | Main shoot only |
| 21 | Main shoot and 1 tiller |
| 22 | Main shoot and 2 tillers |
| 23 | Main shoot and 3 tillers |
| 24 | Main shoot and 4 tillers |
| 25 | Main shoot and 5 tillers |
| 26 | Main shoot and 6 tillers |
| 27 | Main shoot and 7 tillers |
| 28 | Main shoot and 8 tillers |
| 29 | Main shoot and 9 or more tillers |
| 30 | Pseudo stem erection |
| 31 | 1st node detectable |
| 32 | 2nd node detectable |
| 33 | 3rd node detectable |
| 34 | 4th node detectable |
| 35 | 5th node detectable |
| 36 | 6th node detectable |
| 37 | Flag leaf just visible |
| 39 | Flag leaf ligule/collar just visible |
| 40 | - |
| 41 | Flag leaf sheath extending |
| 43 | Boots just visibly swollen |
| 45 | Boots just swollen |
| 47 | Flag leaf sheath opening |
| 49 | First awns visible |
| 50 | First spikelet of inflorescence visible |
| 53 | 1/4 of inflorescence emerged |
| 55 | 1/2 of inflorescence emerged |
| 57 | 3/4 of inflorescence emerged |
| 59 | Emergence of inflorescence completed |
| 60 | Beginning on anthesis |
| 65 | Anthesis half-way |
| 69 | Anthesis completed |
| 70 | - |
| 71 | Kernel watery ripe |
| 73 | Early milk |
| 75 | Medium milk |
| 77 | Late milk |
| 80 | - |
| 83 | Early dough |
| 85 | Soft dough |
| 87 | Hard dough |
| 90 | - |
| 91 | Kernel hard (difficult to divide with thumbnail) |
| 92 | Kernel hard (no longer dented with thumbnail) |
| 93 | Kernel loosening in daytime |
| 94 | Overripe, straw dead and collapsing |
| 95 | Seed dormant |
| 96 | Viable seed giving 50% germination |
| 97 | Seed not dormant |
| 98 | Secondary dormancy induced |
| 99 | Secondary dormancy lost |

## 9. Literature

## 10. Technical Questionnaire

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

| | |
|---|---|
| | Application date:<br>(not to be filled in by the applicant) |

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. Subject of the Technical Questionnaire

| | | |
|---|---|---|
| 1.1 | Botanical name | ×*Triticosecale* Witt. |
| 1.2 | Common name | Triticale |

2. Applicant

| | |
|---|---|
| Name | |
| Address | |
| Telephone No. | |
| Fax No. | |
| E-mail address | |
| Breeder (if different from applicant) | |

3. Proposed denomination and breeder's reference

| | |
|---|---|
| Proposed denomination (if available) | |
| Breeder's reference | |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

#4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

(a) controlled cross [ ]
(please state parent varieties)

(……..……..…) x (……..……..…)

female parent male parent

(b) partially known cross [ ]
(please state known parent variety(ies))

(……..……..…) x (……..……..…)

female parent male parent

(c) unknown cross [ ]

4.1.2 Discovery and development [ ]
(please state where and when discovered and how developed)

4.1.3 Mutation [ ]
(please state parent variety)

4.1.4 Other [ ]
(Please provide details)

# Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

4.2 Method of propagating the variety

4.2.1 Other [ ]

(Please provide details)

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the note which best corresponds).

| | Characteristics | Example Varieties | Note |
|---|---|---|---|
| **5.1 (5)** | **Time of ear emergence** | | |
| | very early | Chopper | 1 [ ] |
| | early | Prime 322 | 3 [ ] |
| | medium | Coral Sea | 5 [ ] |
| | late | Crackerjack | 7 [ ] |
| | very late | Pacific Falcon | 9 [ ] |
| **5.2 (17)** | **Plant: length** | | |
| | very short | | 1 [ ] |
| | short | Chopper | 3 [ ] |
| | medium | Endeavour | 5 [ ] |
| | long | Forerunner | 7 [ ] |
| | very long | | 9 [ ] |
| **5.3 (18)** | **Ear: color** | | |
| | white | Austute | 1 [ ] |
| | slightly colored | Forerunner | 2 [ ] |
| | strongly colored | | 3 [ ] |
| **5.4 (25)** | **Seasonal type** | | |
| | winter type | Coral Sea | 1 [ ] |
| | alternative type | Breakwell | 2 [ ] |
| | spring type | Austute | 3 [ ] |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

6. Similar varieties and differences from these varieties

*Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.*

| Denomination(s) of variety(ies) similar to your candidate variety | Characteristic(s) in which your candidate variety differs from the similar variety(ies) | Describe the expression of the characteristic(s) for the **similar** variety(ies) | Describe the expression of the characteristic(s) for **your** candidate variety |
|---|---|---|---|
| *Example* | | | |
| | | | |
| | | | |
| | | | |

Comments:

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

#7. Additional information which may help in the examination of the variety

7.1 In addition to the information provided in sections 5 and 6, are there any additional characteristics which may help to distinguish the variety?

Yes [ ] No [ ]

(If yes, please provide details)

7.2 Are there any special conditions for growing the variety or conducting the examination?

Yes [ ] No [ ]

(If yes, please provide details)

7.3 Other information

# Authorities may allow certain of this information to be provided in a confidential section of the Technical Questionnaire.

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|---|---|---|

8. Authorization for release

(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?

Yes [ ] No [ ]

(b) Has such authorization been obtained?

Yes [ ] No [ ]

If the answer to (b) is yes, please attach a copy of the authorization.

9. Information on plant material to be examined or submitted for examination

9.1 The expression of a characteristic or several characteristics of a variety may be affected by factors, such as pests and disease, chemical treatment (e.g. growth retardants or pesticides), effects of tissue culture, different rootstocks, scions taken from different growth phases of a tree, etc.

9.2 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If the plant material has undergone such treatment, full details of the treatment must be given. In this respect, please indicate below, to the best of your knowledge, if the plant material to be examined has been subjected to:

| | | | |
|---|---|---|---|
| (a) | Microorganisms (e.g. virus, bacteria, phytoplasma) | Yes [ ] | No [ ] |
| (b) | Chemical treatment (e.g. growth retardant, pesticide) | Yes [ ] | No [ ] |
| (c) | Tissue culture | Yes [ ] | No [ ] |
| (d) | Other factors | Yes [ ] | No [ ] |

Please provide details for where you have indicated “yes”.

.....

10. I hereby declare that, to the best of my knowledge, the information provided in this form is correct:

Applicant’s name

Signature Date

[End of document]