E

TG/259/2(proj.2)
ORIGINAL: English
DATE: 2016-05-20

INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

AGARICUS

UPOV Code(s): AGARI_BIS

Agaricus bisporus (Lange.) Sing.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from European Union

to be considered by the

Technical Working Party for Vegetables
at its fiftieth session, to be held in Brno, Czech Republic,
from 2016-06-27 to 2016-07-01

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

Botanical name	*English*	*French*	*German*	*Spanish*
Agaricus bisporus (Lange.) Sing.	Mushroom; tukuritake	Champignon de couche	Champignon	Champiñón

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.]

TABLE OF CONTENTS PAGE

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Agaricus bisporus* (Lange.) Sing..

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the 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 spawn or pure culture on a suitable medium.

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

(a) 15 litres of spawn.
or
(b) 2 slant tubes or agar plate (petri dish), containing a pure culture.

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

2.5 The 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

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

3.1.2 The two independent growing cycles should be in the form of two separate cultivations.

3.1.3 The growing cycle is considered to be from spawn inoculation until the end of the first flush. Extension of the cultivation period can be requested by the applicant if the distinctness can only be demonstrated in the second and/or third flush.

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

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.

3.4 Test Design

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

3.4.2 Each test should be designed to result in a total of at least 90 fruit bodies in the first flush, which should be divided equally over 3 replicates. 45 fruit bodies should be collected at stage 2 and 45 fruit bodies should be collected at stage 5 (see chapter 8.1 (f))

3.4.3. A minimum growing surface per strain of 1m² is advised in order to attain suffiient fruiting bodies in both stages.

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.

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 fruit bodies or parts of fruit bodies to be Examined

Unless otherwise indicated, for the purposes of distinctness, all observations on single fruit bodies should be made on 90 fruit bodies or parts of fruit bodies taken from each of 90 fruit bodies and any other observations made on all fruit bodies in the test, disregarding any off-type fruit bodies.

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 second column of the Table of Characteristics (see document TGP/9 “Examining Distinctness”, Section 4 “Observation of characteristics”):

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

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 fruit bodies (G) or for single, individual fruit bodies (S)

For the purposes of distinctness, observations may be recorded as a single record for a group of fruit bodies or parts of fruit bodies (G), or may be recorded as records for a number of single, individual fruit bodies or parts of fruit bodies (S). In most cases, “G” provides a single record per variety and it is not possible or necessary to apply statistical methods in a fruit body-by-fruit body 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 For the assessment of uniformity of cross-pollinated varieties, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 90 fruit bodies, 3 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 stock to ensure that it exhibits the same characteristics as those shown by the initial material supplied.

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) Cap: color (characteristic 9)
(b) Gills: color (characteristic 20)
(c) Basidium: spores (characteristic 22)

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 Exemples Beispielssorten Variedades ejemplo	Note/ 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 8.2

6 (a)-(e) See Explanations on the Table of Characteristics in Chapter 8.1

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

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

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1.		**QN VG**	**(+)**				
		Mycelium: intensity					
		weak				J10263	1
		medium				Horronda, Sylvan A15	2
		strong				Brawn, Heirloom	3
2.		**QN VG**	**(+)**				
		Pin setting: number of pins					
		few				Horronda	3
		medium				Amycel 2400	5
		many				Horwitu, Sylvan A15	7
3.	**(*)**	**QN MG**	**(+)**	**2**			
		Time beginning of harvest					
		early				Brawn	3
		medium				Amycel 2400	5
		late				Euromycel 58	7
4.	**(*)**	**QN MG**	**(+)**	**2**			
		Time of peak of first flush					
		early				Heirloom	3
		medium				Amycel 2400, Sylvan A15	5
		late				Brawn, Euromycel 58	7
5.	**(*)**	**QN MS/VG**	**(+) (a), (b)**	**2**			
		Stipe: length	**Stipe : longueur**	**Stiel: Länge**	**Pie: longitud**		
		short	court	kurz	corto	Brawn	3
		medium	moyen	mittel	mediano	Broncoh, Sylvan A15	5
		long	long	lang	largo	Amycel 2400, Horwitu	7
6.	**(*)**	**QN MS/VG**	**(+) (a), (b)**	**2**			
		Stipe: diameter					
		narrow				Somycel 53	3
		medium				Brawn, Broncoh	5
		broad				Horronda	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
7.	**(*)**	**QN MS/VG**	**(a)**	**2**			
		Stipe: ratio length/diameter					
		moderately compressed	modérément compressé	mäßig zusammengedrückt	moderadamente comprimida		3
		medium	moyen	mittel	media	Sylvan A15	5
		moderately elongated	modérément allongé	mäßig länglich	moderadamente alargada	Somycel 53	7
8.	**(*)**	**QL VG**	**(+) (a)**	**2**			
		Stipe: shape in longitudinal section					
		rectangular	rectangulaire	rechteckig	rectangular	Horronda	1
		trapezoidal	trapézoïdale	trapezförmig	trapezoidal	Euromycel 30	2
9.	**(*)**	**PQ VG**	**(c)**				
		Cap: color					
		white				Sylvan A15	1
		greyish white				Somycel 76	2
		brown				Amycel 2400	3
10.		**QL VG**	**(+) (a)**	**2**			
		Varieties with brown cap only: Stipe: color					
		white				Brawn, Heirloom	1
		greyish white				Amycel 2400	2
11.		**QN VG**	**(+) (a)**	**2**			
		Stipe: degree of discoloration					
		absent or weak				Sylvan A15	1
		medium				Heirloom	2
		strong				Somycel 53	3
12.	**(*)**	**QN MS/VG**	**(+) (a), (b)**	**2**			
		Cap: height	**Chapeau : hauteur**	**Hut: Höhe**	**Sombrero: altura**		
		short				J10263	3
		medium				Brawn, Sylvan A15	5
		tall				Euromycel 58	7

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13.	**(*)**	**QN MS/VG**	**(+) (a), (b)**	**2**			
		Cap: diameter					
		small				Horwitu	3
		medium				Broncoh	5
		large				Heirloom, Sylvan A15	7
14.	**(*)**	**QN MS/VG**	**(a)**	**2**			
		Cap: ratio height/diameter					
		moderately compressed				Somycel 76	3
		medium				Broncoh, Sylvan A15	5
		moderately elongated				Heirloom	7
15.		**QN VG**	**(+) (a)**	**2**			
		Varieties with brown caps only: Cap: Shade of scales compared to surface					
		light				Amycel 2400, Heirloom	1
		medium					2
		dark				Brawn	3
16.	**(*)**	**QN MS/VG**	**(+) (a), (b)**	**2**			
		Cap: thickness in longitudinal section	**Chapeau : épaisseur en section longitudinale**	**Hut: Dicke im Längsschnitt**	**Sombrero: espesor en sección longitudinal**		
		thin	mince	dünn	delgado	J10263	3
		medium	moyen	mittel	medio	Broncoh, Horronda	5
		thick	épais	dick	grueso	Sylvan A15	7
17.	**(*)**	**QN VG**	**(+) (a)**	**2**			
		Cap: scaling					
		absent or very weak	absentes ou très peu nombreuses	fehlend oder sehr gering	ausente o muy débil	Somycel 53	1
		weak	peu nombreuses	gering	débil	Horwitu	3
		medium	moyennement nombreuses	mittel	medio	Heirloom, Horronda	5
		strong	nombreuses	stark	fuerte	Somycel 76	7
		very strong	très nombreuses	sehr stark	muy fuerte	Broncoh	9

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18.	**(*)**	**QN VG**	**(a)**	**2**			
		Brown varieties only: intensity of cap color					
		very light				Broncoh, J10263	1
		light				Amycel 2400	3
		medium				Heirloom	5
		dark				Brawn	7
		very dark					9
19.		**QN VG**	**(+) (a)**	**2**			
		Cap: thickness of veil					
		thin				J10263	3
		medium				Horronda, Sylvan A15	5
		thick					7
20.	**(*)**	**PQ VG**	**(d)**	**3**			
		Gills: color					
		pink				BP-1	1
		light brown	marron clair	hellbraun	marrón claro	Horronda, Horwitu	2
		dark brown	marron foncé	dunkelbraun	marrón oscuro	Broncoh	3
21.		**PQ VG**	**(+) (d)**	**3**			
		Varieties with brown caps only: Veil: annulus color					
		white				Amycel 2400, Sylvan 800	1
		brown				Brawn, Heirloom	2
22.	**(*)**	**QL VG**	**(+) (a), (c)**	**(b) (f)**			
		Basidium: spores					
		absent				J10263	1
		present				Sylvan A15	9
23.	**(*)**	**QL MS**	**(+) (d)**	**3**			
		Basidium: number of spores					
		two				Heirloom, Horwitu	1
		four				JB-2	2

		English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
24.		**QN MG**	**(+)**	**4**			
		Time of fully opening of cap					
		early				Horwitu	3
		medium				Amycel 2400, Sylvan A15	5
		late				Brawn, Heirloom	7
25.	**(*)**	**QN VG**	**(c), (e)**	**5**			
		Open cap: Stipe distance from base to annulus					
		short				Amycel 2400	3
		medium				Broncoh	5
		long				Horwitu	7
26.	**(*)**	**QN MS/VG**	**(c), (e)**	**5**			
		Open cap: diameter					
		small				Horwitu	3
		medium				Broncoh, Sylvan A15	5
		large				Amycel 2400, Heirloom	7
27.	**(*)**	**QN MS/VG**	**(c), (e)**	**5**			
		Open cap: thickness	**Chapeau ouvert : épaisseur**	**Offener Hut: Dicke**	**Sombrero abierto: espesor**		
		thin				J10263	3
		medium				Horwitu, Sylvan A15	5
		thick				Brawn, Heirloom	7
28.	**(*)**	**QN VG**	**(+)**	**(c)**	**5**		
		Open cap: fraying of margin	**Chapeau ouvert : effilochage du bord**	**Offener Hut: Ausfransen des Randes**	**Sombrero abierto: deshilachado del borde**		
		absent or weak				Amycel 2400	1
		moderate				Broncoh, Horwitu	2
		strong				Heirloom, Horronda	3

		English		français		deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
29.	**(*)**	**PQ**	**VG**	**(+)**	**(c)**	**5**			
		Open cap: shape of central part of upper side		**Chapeau ouvert : forme de la partie centrale de la face supérieure**		**Offener Hut: Form des mittleren Teils der Oberseite**	**Sombrero abierto: forma del centro de la parte superior**		
		rounded						Euromycel 58, Sylvan A15	1
		plane						Heirloom	2
		depressed						Broncoh	3

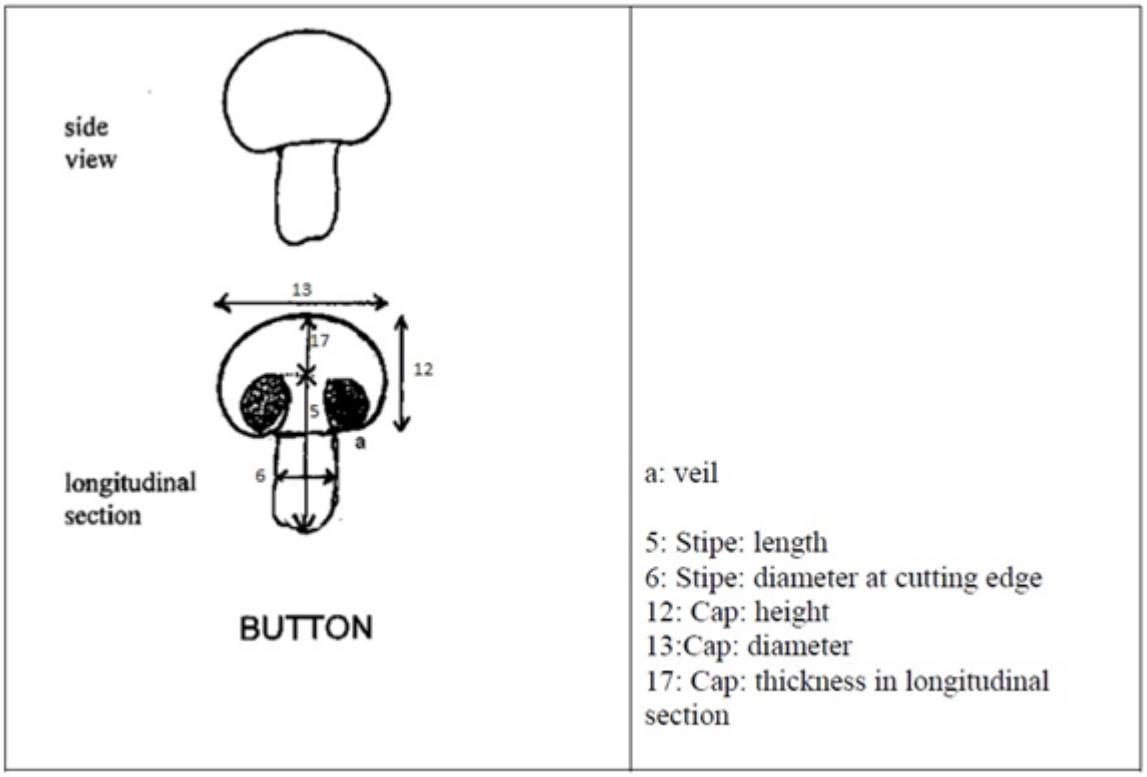
8. Explanations on the Table of Characteristics

8.1 Explanations covering several characteristics

Characteristics containing the following key in the second column of the Table of Characteristics should be examined as indicated below:

(a) Stipe, cap: Unless otherwise indicated, all characteristics of the stipe and the cap should be made at growth stage 2, when the fruit body appears as a button mushroom with the veil closed

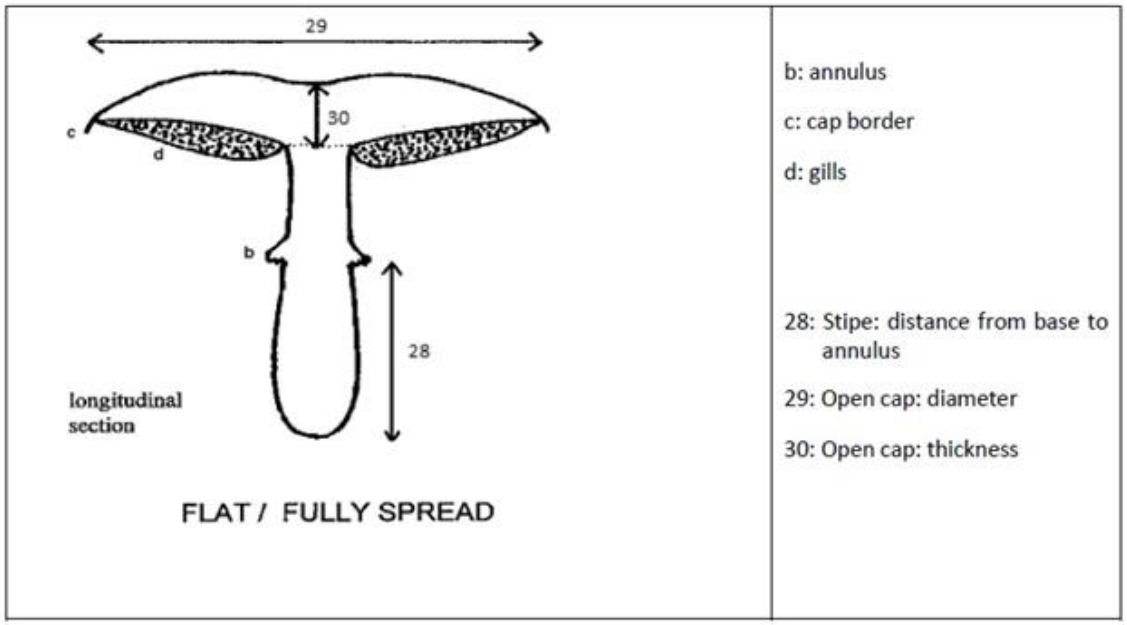
(b)



(c) Open cap: Unless otherwise indicated, all characteristics of the open cap should be made at growth stage 5, when the cap of the fruit body is fully open and flat

(d) Gills: Unless otherwise indicated, all characteristics of the gills should be made at growth stage 3, when the fruit body appears as a button mushroom with the veil breaking

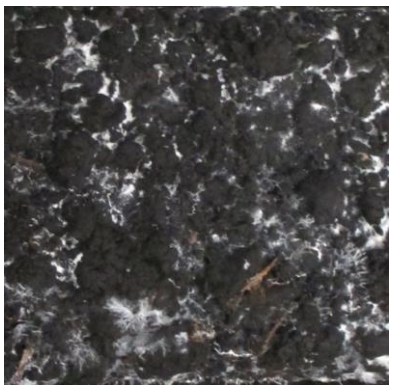
(e)



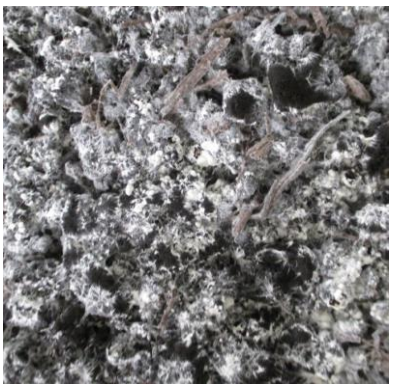
8.2 Explanations for individual characteristics

Ad. 1: Mycelium: intensity

1
weak



2
medium



3
strong

Ad. 2: Pin setting: number of pins

The number of pins larger than 3 mm is visually assessed 4 days after aeration.

Ad. 3: Time beginning of harvest

The time of the first day of harvest is is recorded when 50% of the fruiting bodies in the first flush have reached growth stage 2

Ad. 4: Time of peak of first flush

The dates of harvest of fruit bodies at growth stage 2 are recorded. The time of the peak of the first flush is the time at which the largest number of fruit bodies was harvested.

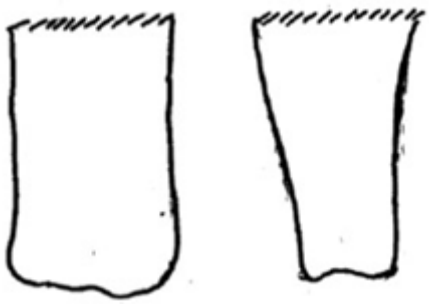
Ad. 5: Stipe: length

The fruit bodies observed at growth stage 2 should be cut longitudinally.

Ad. 6: Stipe: diameter

To be observed half way along the length of the stipe

Ad. 8: Stipe: shape in longitudinal section



1
rectangular

2
trapezoidal

Ad. 10: Varieties with brown cap only: Stipe: color

The stipe color is assessed visually after removing the caps.

Ad. 11: Stipe: degree of discoloration

1
absent or weak

2
medium

Ad. 12: Cap: height

The fruit bodies observed at growth stage 2 should be cut longitudinally.

Ad. 13: Cap: diameter

The fruit bodies observed at growth stage 2 should be cut longitudinally.

Ad. 15: Varieties with brown caps only: Cap: Shade of scales compared to surface

1
light

2
medium

Ad. 16: Cap: thickness in longitudinal section

The fruit bodies observed at growth stage 2 should be cut longitudinally.

Ad. 17: Cap: scaling

1
absent or very weak

3
weak

5
medium

7
strong

9
very strong

Ad. 19: Cap: thickness of veil

3
thin

7
thick

Ad. 21: Varieties with brown caps only: Veil: annulus color

1
white

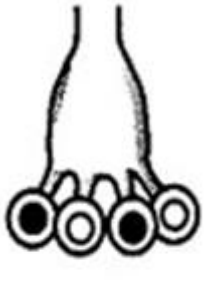
2
brown

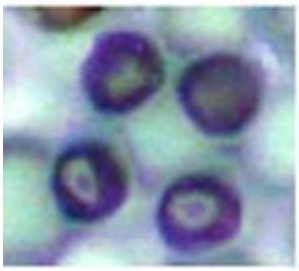
Ad. 22: Basidium: spores

To be observed by rubbing mature gills (pictures to be provided)

Ad. 23: Basidium: number of spores

The number of spores in the majority of the basidia is counted in ten basidia within a single microscopic slide. The basidia and their spores can best be visualized using a 400× magnification of a dry mounted lamellar surface.





1
two

4
four

Ad. 24: Time of fully opening of cap

The time of cap opening is the first day on which the veil of a single fruiting body is completely torn.

Ad. 28: Open cap: fraying of margin

1
absent or weak

2
moderate

3
strong

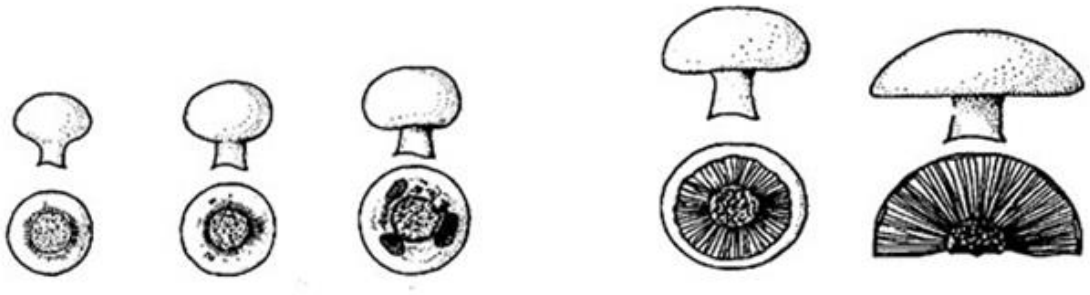
Ad. 29: Open cap: shape of central part of upper side

1
rounded

2
plane

3
depressed

8.3 Growth Stages



1 2 3 4 5

Explanation: 1, 2 and 3 - button stage
1 and 2 - veil closed
3 - veil breaking
4 - opening / gills visible
5 - fully open / flat stage

9. Literature

Flegg, P.B., Spencer, D.M. and Wood, D.A., 1985: The biology and technology of the cultivated mushroom. J. Wiley & Son, 347 pp.

Fletcher, J.T. & Gaze R.H., 2007: Mushroom growing. In: Mushroom pest and disease control: a colour handbook, Manson Publishing Ltd, pp. 7-21.

Foulongne-Oriol., M, Rodier, A., Caumont, P., Spataro, C., Savoie, J.M., 2011: Agaricus bisporus cultivars: hidden diversity beyond apparent uniformity? In: Proceedings of the 7th international conference on mushroom biology and mushroom products, vol 2. pp 9–16.

Fritsche, G., 1964: Versuche zur Frage der Merkmalsübertragung beim Kulturchampignon Agaricus (Psalliota) bisporus (Lge.) Sing. Der Züchter 34-2: 76-93.

Fritsche, G., 1988: Spawn: properties and preparation, In: The Cultivation of Mushrooms, Darlington Mushroom Laboratories, pp. 91-99.

Neut, A. van der, 1991: The development of a set of characteristics for DUS tests of cultivated mushroom varieties. In: Genetics and breeding of Agaricus, Pudoc Wageningen, pp. 153-160.

Nichols, 1985. Post-harvest physiology and storage. Pp 195-210. In: Flegg P.B., Spencer D.M., Wood D.A. 1985: The biology and technology of the cultivated mushroom. J. Wiley & Son, 347 pp.

Parra Sánchez L.A. 2008: Fungi Europaei. Agaricus L. – Allopsalliota vol 1. Candusso Edizioni, 824 pp.

Parra Sánchez L.A., 2013: Fungi Europaei. Agaricus L. – Allopsalliota vol 2, Candusso Edizioni, 1168 pp.

Vooren, J.G. van de, Polder, G. & Heijden, G.W.A.M. van der, 1991: Application of image analysis for variety testing of mushroom. Euphytica 57: 245-250.

Vooren, J.G. van de, Polder, G. & Heijden, G.W.A.M. van der, 1992: Identification of mushroom cultivars using image analysis. Transactions of the ASAE 35-1: 347-350.

10. Technical Questionnaire

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

	Application date: (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	*Agaricus bisporus* (Lange.) Sing.
1.2	Common name	Mushroom; tukuritake

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

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

4.2 Method of propagating the variety

4.2.1 Vegetative propagation

(a) *In vitro* propagation [ ]
(b) Other (state method) [ ]

4.2.2 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	**Time of peak of first flush**		
(4)			
	early	Heirloom	3 [ ]
	medium	Amycel 2400, Sylvan A15	5 [ ]
	late	Brawn, Euromycel 58	7 [ ]
5.2	**Cap: color**		
(9)			
	white	Sylvan A15	1 [ ]
	greyish white	Somycel 76	2 [ ]
	brown	Amycel 2400	3 [ ]
5.3	**Cap: diameter**		
(13)			
	small	Horwitu	3 [ ]
	medium	Broncoh	5 [ ]
	large	Heirloom, Sylvan A15	7 [ ]
5.4	**Gills: color**		
(20)			
	pink	BP-1	1 [ ]
	light brown	Horronda, Horwitu	2 [ ]
	dark brown	Broncoh	3 [ ]
5.5	**Basidium: spores**		
(22)			
	absent	J10263	1 [ ]
	present	Sylvan A15	9 [ ]
5.6	**Basidium: number of spores**		
(23)			
	two	Heirloom, Horwitu	1 [ ]
	four	JB-2	2 [ ]

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.

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 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 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 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 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]