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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

AGARICUS

UPOV Code(s):

AGARI_BIS

Agaricus bisporus (Lange.) Sing.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

Alternative names:*

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Agaricus bisporus</i> (Lange.) Sing.	Mushroom	Agaric, 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.]

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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.

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 120 fruit bodies, which should be divided between at least 3 replicates.

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 30 fruit bodies or parts of fruit bodies taken from each of 30 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 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 These Test Guidelines have been developed for the examination of vegetatively propagated 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 For the assessment of uniformity of vegetatively propagated 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 30 fruit bodies, 1 off-type is allowed. In the case of a sample size of 120 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) Time of beginning of harvest (characteristic 3)
- (b) Cap: color (characteristic 7)
- (c) Cap: diameter (characteristic 12)
- (d) Gills: color (characteristic 18)
- (e) Basidium: spores (characteristic 20)

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:

<i>State</i>	<i>Note</i>
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:

<i>State</i>	<i>Note</i>
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)-(c) See Explanations on the Table of Characteristics in Chapter 8.1
- 7 Growth stage key See Explanations on the Table of Characteristics in Chapter 8.3

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: density		Mycélium : densité	Myzel: Dichte	Micelio: densidad		
	weak		faible	gering	débil	J10263	1
	medium		moyenne	mittel	media	Horronda, Sylvan A15	2
	strong		forte	stark	fuerte	Brawn, Heirloom	3
2.	QN	VG	(+)				
	Number of pins		Nombre de tiges	Anzahl Knoten	Número de primordios		
	few		petit	gering	bajo	Horronda	3
	medium		moyen	mittel	medio	Amycel 2400	5
	many		grand	groß	alto	Horwitu, Sylvan A15	7
3. (*)	QN	MG	(+)		2		
	Time of beginning of harvest		Époque de début de récolte	Zeitpunkt des Erntebeginns	Época de comienzo de la cosecha		
	early		précoce	früh	temprana	Brawn, Euromycel 30	3
	medium		moyenne	mittel	media	Amycel 2400, Sylvan A15	5
	late		tardive	spät	tardía	Euromycel 58	7
4. (*)	QN	MS/VG	(a), (c)		2		
	Stipe: length		Stipe : longueur	Stiel: Länge	Pie: longitud		
	short		court	kurz	corto	Brawn	3
	medium		moyen	mittel	medio	Broncoh, Sylvan A15	5
	long		long	lang	largo	Amycel 2400, Horwitu	7
5. (*)	QN	MS/VG	(+)	(a)	2		
	Stipe: diameter		Stipe : diamètre	Stiel: Durchmesser	Pie: diámetro		
	small		petit	klein	pequeño	Somycel 53	3
	medium		moyen	mittel	medio	Brawn, Broncoh	5
	large		grand	groß	grande	Horronda	7
6. (*)	QN	MS/VG	(+)		2		
	Stipe: ratio length/diameter		Stipe : rapport longueur/diamètre	Stiel: Verhältnis Länge/Durchmesser	Pie: relación longitud/diámetro		
	low		bas	klein	baja	Brawn	3
	medium		moyen	mittel	media	Sylvan A15	5
	high		élevé	groß	alta	Somycel 53	7

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
7. (*)	PQ	VG		2			
	Cap: color		Chapeau : couleur	Hut: Farbe	Sombrero: color		
	white		blanc	weiß	blanco	Sylvan A15	1
	greyish white		blanc grisâtre	gräulichweiß	blanco grisáceo	Somycel 76	2
	brown		marron	braun	marrón	Amycel 2400	3
8. (*)	QN	VG		2			
	Only varieties with brown cap: Cap: intensity of color		Seulement les variétés à chapeau marron : Chapeau : intensité de la couleur	Nur Sorten mit braunem Hut: Hut: Intensität der Farbe	Solo variedades con sombrero marrón: Sombrero: intensidad del color		
	very light		très claire	sehr hell	muy claro	Broncoh, J10263	1
	light		claire	hell	claro	Amycel 2400	3
	medium		moyenne	mittel	medio	Heirloom	5
	dark		foncée	dunkel	oscuro	Brawn	7
	very dark		très foncée	sehr dunkel	muy oscuro	BP-1	9
9.	QL	VG	(+)	2			
	Only varieties with brown cap: Stipe: color		Seulement les variétés à chapeau marron : Stipe : couleur	Nur Sorten mit braunem Hut: Stiel: Farbe	Solo variedades con sombrero marrón: Pie: color		
	white		blanc	weiß	blanco	Brawn, Heirloom	1
	greyish white		blanc grisâtre	gräulichweiß	blanco grisáceo	Amycel 2400	2
10.	QL	VG	(+)	2			
	Stipe: oxidation of cut surface		Stipe : oxydation de la surface coupée	Stiel: Oxidation der Schnittfläche	Pie: oxidación de la superficie de corte		
	absent		absente	fehlend	ausente	Sylvan A15	1
	present		présente	vorhanden	presente	Heirloom, Somycel 53	9
11. (*)	QN	MS/VG	(a), (c)	2			
	Cap: height		Chapeau : hauteur	Hut: Höhe	Sombrero: altura		
	short		court	niedrig	bajo	J10263	3
	medium		moyen	mittel	medio	Brawn, Sylvan A15	5
	tall		haut	hoch	alto	Euromycel 58	7
12. (*)	QN	MS/VG	(a), (c)	2			
	Cap: diameter		Chapeau : diamètre	Hut: Durchmesser	Sombrero: diámetro		
	small		petit	klein	pequeño	Horwitu	3
	medium		moyen	mittel	medio	Broncoh	5
	large		grand	groß	grande	Heirloom, Sylvan A15	7

	English		français		deutsch		español		Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
13. (*)	QN	MS/VG	(+)		2					
	Cap: ratio height/diameter		Chapeau : rapport hauteur/diamètre		Hut: Verhältnis Höhe/Durchmesser		Sombrero: relación altura/diámetro			
	low		bas		klein		baja		Somycel 76	3
	medium		moyen		mittel		media		Broncoh, Sylvan A15	5
	high		élevé		groß		alta		Heirloom	7
14.	QL	VG	(+)		2					
	<u>Only varieties with brown cap:</u> Cap: shade of scales compared to surface		<u>Seulement les variétés à chapeau marron :</u> Chapeau : ton des écailles par rapport à la surface		<u>Nur Sorten mit braunem Hut:</u> Hut: Tönung der Schuppen im Vergleich zur Oberfläche		<u>Solo variedades con sombrero marrón:</u> Sombrero: tono de las escamas en comparación con la superficie			
	lighter		plus clair		heller		más claro		Amycel 2400, Heirloom	1
	darker		plus foncé		dunkler		más oscuro			9
15. (*)	QN	MS/VG		(a), (c)	2					
	Cap: thickness in longitudinal section		Chapeau : épaisseur en section longitudinale		Hut: Dicke im Längsschnitt		Sombrero: grosor en sección longitudinal			
	thin		fin		dünn		delgado		J10263	3
	medium		moyen		mittel		medio		Broncoh, Horronda	5
	thick		épais		dick		grueso		Sylvan A15	7
16. (*)	QN	VG	(+)		2					
	Cap: scaling		Chapeau : écailles		Hut: Schuppenbildung		Sombrero: presencia de escamas			
	absent or very weak		absentes ou très peu nombreuses		fehlend oder sehr gering		nula o muy escasa		Somycel 53	1
	weak		peu nombreuses		gering		escasa		Horwitu	3
	medium		moyennement nombreuses		mittel		media		Horronda, Heirloom	5
	strong		nombreuses		stark		abundante		Somycel 76	7
	very strong		très nombreuses		sehr stark		muy abundante		Broncoh	9
17.	QN	VG	(+)		2					
	Cap: thickness of veil		Chapeau : épaisseur du voile		Hut: Dicke des Velums		Sombrero: grosor del velo			
	thin		fin		dünn		delgado		J10263	1
	medium		moyen		mittel		medio			2
	thick		épais		dick		grueso		Horronda, Sylvan A15	3

	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18. (*)	PQ	VG		2			
	Gills: color		Lamelles : couleur	Lamellen: Farbe	Laminillas: color		
	pink		rose	pink	rosa	BP-1	1
	light brown		marron clair	hellbraun	marrón claro	Horronda, Horwitu	2
	dark brown		marron foncé	dunkelbraun	marrón oscuro	Broncoh	3
19.	QL	VG	(+)	3			
	Only varieties with brown cap: Veil: annulus color		Seulement les variétés à chapeau marron : Voile : couleur de l'anneau	Nur Sorten mit braunem Hut: Velum: Farbe der Manschette	Solo variedades con sombrero marrón: Velo: color del anillo		
	white		blanc	weiß	blanco	Amycel 2400, Sylvan 800	1
	brown		marron	braun	marrón	Brawn, Heirloom	2
20. (*)	QL	VG	(+)	3			
	Basidium: spores		Basidiome : spores	Basidium: Sporen	Basidio: esporas		
	absent		absentes	fehlend	ausentes	J10263	1
	present		présentes	vorhanden	presentes	Sylvan A15	9
21.	QN	MG					
	Time of cap opening		Époque d'ouverture du chapeau	Zeitpunkt der Hutöffnung	Época de apertura del sombrero		
	early		précoce	früh	temprana	Horwitu	3
	medium		moyenne	mittel	media	Amycel 2400, Sylvan A15	5
	late		tardive	spät	tardía	Brawn, Heirloom	7
22. (*)	QN	VG	(b)	5			
	Stipe: distance from base to annulus		Stipe : distance de la base à l'anneau	Stiel: Abstand von Basis zu Manschette	Pie: distancia desde la base del pie al anillo		
	short		courte	niedrig	corta	Amycel 2400	3
	medium		moyenne	mittel	media	Broncoh	5
	long		longue	lang	larga	Horwitu	7
23. (*)	QN	MS/VG	(b)	5			
	Open cap: diameter		Chapeau ouvert : diamètre	Offener Hut: Durchmesser	Sombrero abierto: diámetro		
	small		petit	klein	pequeño	Horwitu	3
	medium		moyen	mittel	medio	Broncoh, Sylvan A15	5
	large		grand	groß	grande	Amycel 2400, Heirloom	7

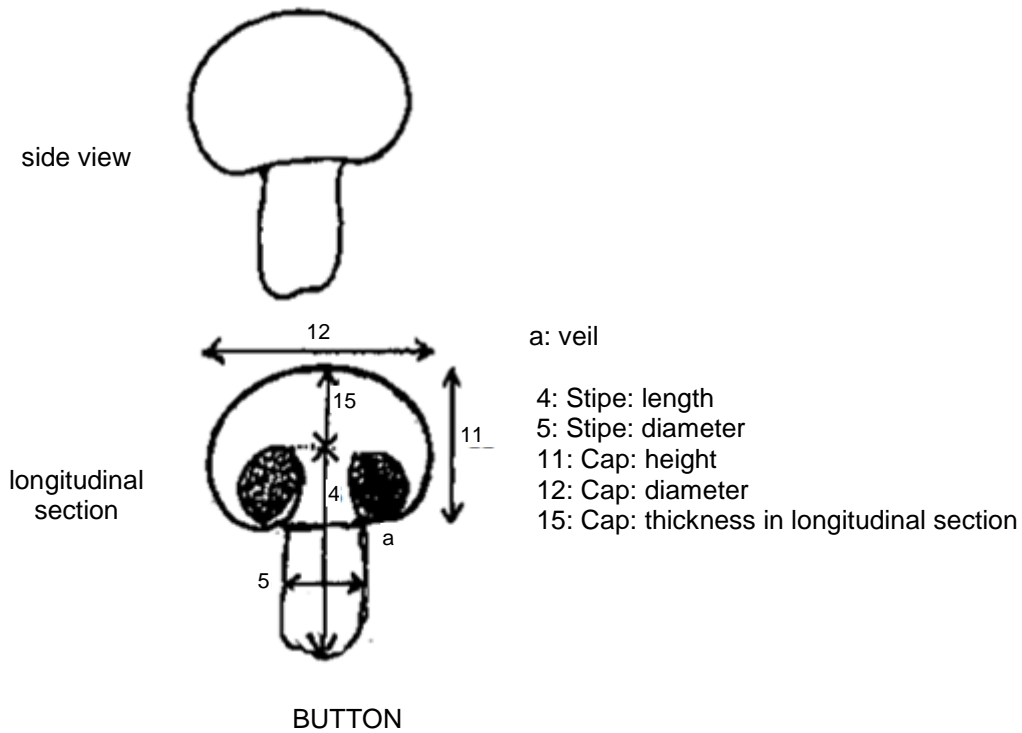
	English		français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
24. (*)	QN	MS/VG	(b)	5			
	Open cap: thickness	Chapeau ouvert : épaisseur	Offener Hut: Dicke	Sombrero abierto: grosor			
	thin	fin	dünn	delgado	J10263		3
	medium	moyen	mittel	medio	Horwitu, Sylvan A15		5
	thick	épais	dick	grueso	Brawn, Heirloom		7
25. (*)	QN	VG	(+)	5			
	Open cap: fraying of margin	Chapeau ouvert : effilochage du bord	Offener Hut: Ausfransen des Randes	Sombrero abierto: deshilachado del borde			
	absent or weak	absent ou faible	fehlend oder gering	ausente o leve	Amycel 2400, J10263		1
	moderate	modéré	mäßig	moderado	Broncoh, Horwitu		2
	strong	prononcé	stark	intenso	ML0406		3
26. (*)	QN	VG	(+)	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 de la parte central de la cara superior			
	rounded	arrondie	abgerundet	redondeada	Euromycel 58, ML1496		1
	flattened	aplatie	abgeflacht	aplanada	Heirloom		2
	depressed	déprimée	eingesenkt	deprimida	Broncoh		3

8. Explanations on the Table of Characteristics

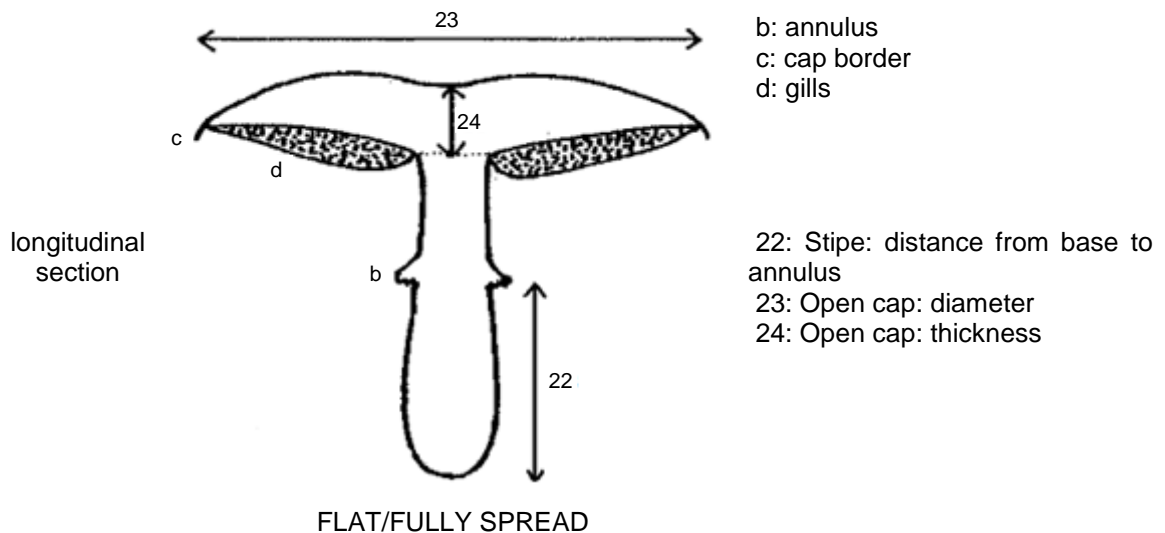
8.1 *Explanations covering several characteristics*

Characteristics containing the following key should be examined as indicated below:

(a)



(b)



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

8.2 Explanations for individual characteristics

Ad. 2: Number of pins

A pin is a young primordial fruit body. The number of pins larger than 3 mm is visually observed 4 days after aeration.

Ad. 3: Time of beginning of harvest

The time of beginning of harvest is reached when more than 5 fruit bodies in the first flush have reached growth stage 2.

Ad. 5: Stipe: diameter

To be observed in the middle of the stipe.

Ad. 6: Stipe: ratio length/diameter



3
low



5
medium



7
high

Ad. 9: Only varieties with brown cap: Stipe: color

The stipe color is observed at harvest.

Ad. 10: Stipe: oxidation of cut surface

The stipes are cut transversally in the middle. Oxidation of the cut surface (observed visually as a yellowish to pink to red discoloration of the cut surface) should be observed 2 to 10 minutes after cutting.



Ad. 13: Cap: ratio height/diameter



3
low

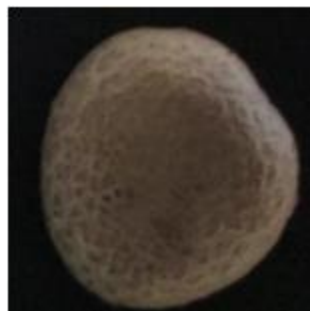


7
high

Ad. 14: Only varieties with brown cap: Cap: shade of scales compared to surface

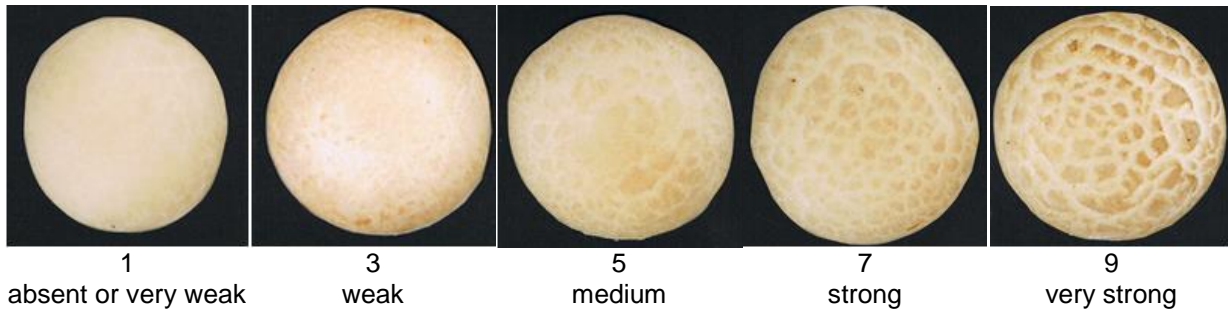


1
lighter

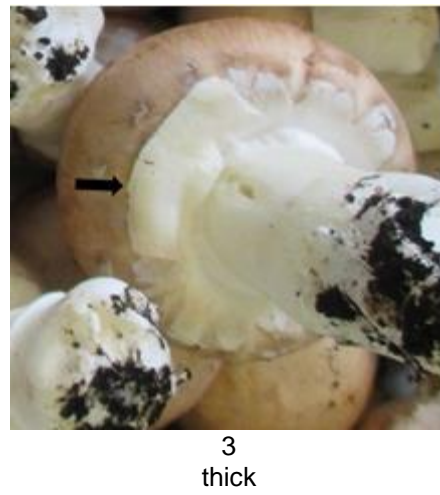


9
darker

Ad. 16: Cap: scaling



Ad. 17: Cap: thickness of veil



Ad. 19: Only varieties with brown cap: Veil: annulus color



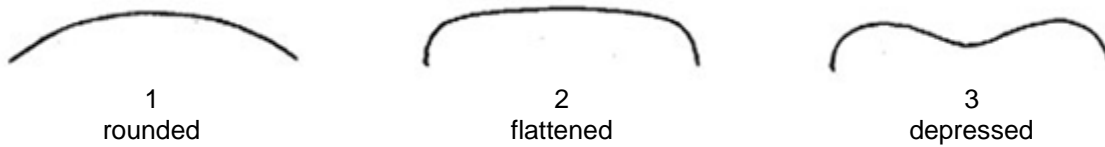
Ad. 20: Basidium: spores

To be observed by making a sporeprint according to the methodology described by Singer (1986). If spores are formed, a sporeprint can be obtained by allowing a stage 3 fruiting body to ripen at room temperature above a sheet of white paper, which is placed below the gills. Spores of a fungal body fall onto the surface of the paper underneath. Presence of spores is revealed after two days, when a clear black-brown print on the paper has been obtained.

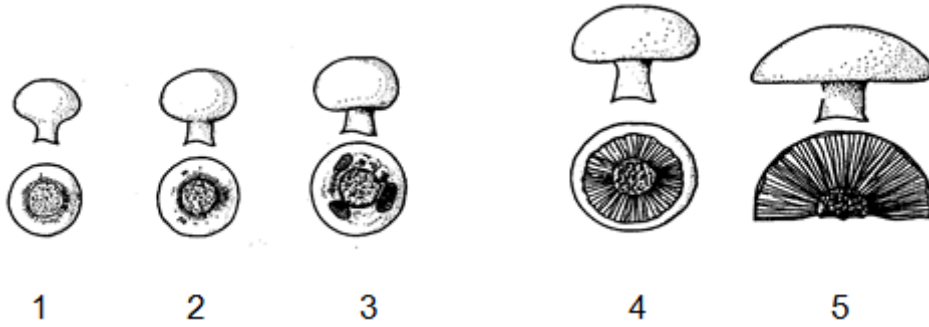
Ad. 25: Open cap: fraying of margin



Ad. 26: Open cap: shape of central part of upper side



8.3 Growth Stages



Explanation: 1 and 2 - button stage; veil closed
3 - button stage; veil breaking
4 - Between button stage and fully open/flat stage, 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.

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Singer, R., 1986: The Agaricales in modern taxonomy, 4th edition. Koelts, Koenigstein, DE.

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:
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	Application date: (not to be filled in by the applicant)
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TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1.	Subject of the Technical Questionnaire	
1.1	Botanical name	<input type="text" value="Agaricus bisporus (Lange.) Sing."/>
1.2	Common name	<input type="text" value="Agaricus"/>
2.	Applicant	
	Name	<input type="text"/>
	Address	<input type="text"/>
	Telephone No.	<input type="text"/>
	Fax No.	<input type="text"/>
	E-mail address	<input type="text"/>
	Breeder (if different from applicant)	<input type="text"/>
3.	Proposed denomination and breeder's reference	
	Proposed denomination (if available)	<input type="text"/>
	Breeder's reference	<input type="text"/>

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

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

(c) unknown cross []

4.1.2 Mutation []
(please state parent variety)

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

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:
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4.2	Method of propagating the variety	
4.2.1	Vegetative propagation	
(a)	<i>In vitro</i> propagation	[]
(b)	Other (state method)	[]
	<input type="text"/>	
4.2.2	Other (Please provide details)	[]
	<input type="text"/>	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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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 beginning of harvest (3)		
very early		1 []
very early to early		2 []
early	Brawn, Euromycel 30	3 []
early to medium		4 []
medium	Amycel 2400, Sylvan A15	5 []
medium to late		6 []
late	Euromycel 58	7 []
late to very late		8 []
very late		9 []
5.2 Cap: color (7)		
white	Sylvan A15	1 []
greyish white	Somycel 76	2 []
brown	Amycel 2400	3 []
5.3 Cap: diameter (12)		
very small		1 []
very small to small		2 []
small	Horwitu	3 []
small to medium		4 []
medium	Broncoh	5 []
medium to large		6 []
large	Heirloom, Sylvan A15	7 []
large to very large		8 []
very large		9 []
5.4 Gills: color (18)		
pink	BP-1	1 []
light brown	Horronda, Horwitu	2 []
dark brown	Broncoh	3 []
5.5 Basidium: spores (20)		
absent	J10263	1 []
present	Sylvan A15	9 []

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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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
<i>Example</i>	<i>Cap: color</i>	<i>greyish white</i>	<i>brown</i>

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Comments:

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

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