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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

SHIITAKE

UPOV Code: LENTI_ELO

JP: Botanical name has been checked

Lentinula edodes (Berk.) Pegler

(Botanical name and UPOV code to be considered in conjunction with document TWV/44/5)

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

*prepared by an expert from Japan**to be considered by**the Technical Working Party for Vegetables**at its forty-fourth session, to be held in Veliko Tarnovo, Bulgaria, from July 5 to 9, 2010*

Alternative Names: *

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Lentinula edodes</i> (Berk.) Pegler	Shiitake, Oak Mushroom			

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.]

<u>TABLE OF CONTENTS</u>	<u>PAGE</u>
1. SUBJECT OF THESE TEST GUIDELINES.....	3
2. MATERIAL REQUIRED	3
3. METHOD OF EXAMINATION.....	3
3.1 Number of Growing Cycles	3
3.2 Testing Place	3
3.3 Conditions for Conducting the Examination.....	4
3.4 Test Design	4
3.5 Additional Tests	4
4. ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY	4
4.1 Distinctness	4
4.2 Uniformity.....	6
4.3 Stability	6
5. GROUPING OF VARIETIES AND ORGANIZATION OF THE GROWING TRIAL.....	6
6. INTRODUCTION TO THE TABLE OF CHARACTERISTICS	7
6.1 Categories of Characteristics.....	7
6.2 States of Expression and Corresponding Notes.....	7
6.3 Types of Expression.....	8
6.4 Example Varieties	8
6.5 Legend.....	8
7. TABLE OF CHARACTERISTICS/TABLEAU DES CARACTERES/MERKMALSTABELLE/TABLA DE CARACTERES.....	9
8. EXPLANATIONS ON THE TABLE OF CHARACTERISTICS	18
8.1 Explanations covering several characteristics	18
8.2 Explanations for individual characteristics	18
9. LITERATURE	24
10 TECHNICAL QUESTIONNAIRE.....	25

Comments

UA: Ukraine

HU: Hungary

JP: Japan

Highlighting: amendments in accordance with document TGP/7/2

1. Subject of these Test Guidelines

These Test Guidelines apply to all varieties of *Lentinula edodes* (Berk.) Pegler (~~Marasmiaceae~~).

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 and as a pure culture on a suitable medium.

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

1 liter of spawn and 3 slant tubes containing a pure culture.

HU: we propose 2 liters spawn

JP: agree to proposal

2.4 If spawn is delivered it should be of a quality which ensures that all relevant characteristics of the variety will be expressed. In particular, mycelium on grain should be visible to the naked eye, the grain should not be colonized to such an extent that kernels stick together. The spawn should not be older than 3 months and having been stored under proper conditions.

2.5 If pure cultures are delivered, they must be shipped on slant agar tubes with appropriate medium such as PDA (potato dextrose agar) or Melt extract agar. Tubes should be covered by cotton plugs or silicon plugs or plastic caps allowing sterile air diffusion. Cultures should be fresh, i.e. not stored for longer than 2 weeks at low temperature.

3. Method of Examination

3.1 Number of Growing Cycles

The minimum duration of tests should normally be a single growing cycle (two harvestings).

HU: at bed-log cultivation. Two growing cycle at sawdust cultivation (harvesting only 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*

~~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 recommended method of observing the characteristic is indicated by the following key in the second column of the Table 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.~~

3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least 75 wood logs or 75 sawdust blocks, which should be divided between at least two replicates.

3.4.2 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.

3.5 *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 / Parts of fruit bodies to be Examined

Unless otherwise indicated, all observations for the purposes of distinctness should be made on at least 50 fruit bodies or parts taken from each of 50 fruit bodies, disregarding any off-type plants.

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 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 For the assessment of uniformity, a population standard of 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of [(HU: 100 => 50 (see 3.4)] fruit bodies, [HU: 3 => 2] 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:

JP: propose to add following grouping char. (only TQ)

- () **Spawn**: cultivation type (1: bed-log cultivation 2: saw-dust cultivation)
- (a) **Cap**: shape of vertical section (characteristic 10)
- (b) **Cap**: color of upper side (characteristic 12)
- (c) **Cap**: distribution of scale (characteristic 15)
- (d) **Gill**: shape (characteristic 18)
- (e) **Stipe**: shape (characteristic 23)

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*

(*) Asterisked characteristic – see Chapter 6.1.2

QL Qualitative characteristic – see Chapter 6.3

QN Quantitative characteristic – see Chapter 6.3

PQ Pseudo-qualitative characteristic – see Chapter 6.3

MG, MS, VG, VS – see Chapter 4.1.5

Type of example variety belong to:

(B) = Bed-log cultivation type, (S) = Sawdust cultivation type

JP: Explanation of Cultivation Type

Bed-log cultivation type: Group of varieties that is suited to bed-log cultivation. And group of varieties that can be grown only by bed-log cultivation.

Sawdust cultivation type: Group of varieties that is suited to sawdust cultivation. Bed-log and sawdust both cultivation type that can be grown are included in the sawdust cultivation type.

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

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielsorten/ Variedades ejemplo	Note/ Nota
1. VG	Hyphae: density					
QN	(a)	sparse			HS607, Mori XR1	1
		intermediate			Morino Natsumi	2
		dense			KX-S055	3
2. VG	Aerial hyphae: development					
(+)						
QN	(a)	weak			HS607	3
		medium			Morino Natsumi, KX-S055	5
		strong			KX-S005	7
3. VG	Colony: color of surface					
(*)						
QL	(a)	white			Morino Natsumi, Mori XR1	1
		brownish			HS607, KX-S055	2
4. MS	Mycelia: optimum temperature for growth					
(*)						
(+)						
QN	(b)	Lower than 23°C				1
		23°C			Kinko 243	3
		25°C			Kinko 115, HS607, Mori XR1	5
		27°C			Morino Natsumi	7
		higher than 27°C				9
5. MS	Mycelia: growth rate at 10°C					
(*)						
(+)						
	HU: propose to delete char. 5-9. The optimum temperature will be established in char. 4 therefore it is not important to know at which temperature is the mycelium growing slower.					
	JP: propose to add explanations					
QN	(b)	slow				3
		medium			HS607	5
		fast			KX-S055	7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota	
6.	MS	Mycelia: growth					
(*)		rate at 15°C					
(+)							
QN	(b)	slow				3	
		medium			Susono 360, HS607	5	
		fast			Yujiro	7	
7.	MS	Mycelia: growth					
(*)		rate at 20°C					
(+)							
QN	(b)	slow				3	
		medium			Morino Natsumi	5	
		fast				7	
8.	MS	Mycelia: growth					
(*)		rate at 25°C					
(+)							
QN	(b)	slow				3	
		medium			Susono 360, HS73	5	
		fast				7	
9.	MS	Mycelia: growth					
(*)		rate at 30°C					
(+)							
QN	(b)	slow				3	
		medium			Kinko 115	5	
		fast			Morino Natsumi	7	
10.	VG	Cap: shape of					
(*)		vertical section					
(+)							
PQ	(c)	umbilicate				1	
		flat				2	
		convex				3	
		umbonate				4	

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
11. (*)	VG/MS	Cap: diameter		UA: For characteristic 11: QN instead of PQ		
(+)	(c)	small			Morino Harumitsu	3
PQ		medium			HS73	5
QN		large				7
12. (*)	VG	Cap: color of upper side				
PQ	(c)	white			Kinko 989	1
		yellowish brown			HS73	2
		brown			Susono 360, HS607	3
		reddish brown			Akiyama A-526	4
13. (*)	MS	Cap: thickness				
(+)	(c)	thin			Morino Harumitsu	3
QN		medium			Susono 360, Morino Natsumi, KX-S055	5
		thick			Akiyama A-526	7
14.	VS	Cap: hardness		UA: For characteristic 14: QL instead of QN JP: propose to be indicate as PQ		
QN	(c)	soft=>softness				3=>1
PQ		medium=>intermediate			Susono 360, HS607, KX-S055	5=>2
		hard=>solidity			Akiyama A-526	7=>3

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota	
15. (*) (+)	VG	Cap: distribution of scale	HU: How can we establish the size of the scale (char.16) at this type?				
QL	(c)	whole			Akiyama A-526	1	
		periphery			Susono 360, Morino Natsumi, KX-S055	2	
16. (+)	VG	Cap: size of scale	HU: Photo is necessary, because the observation of this characteristic is difficult. The example varieties are almost the same as 15.				
QN	(c)	small			HS73	3	
		medium			Susono 360, Morino Natsumi	5	
		large			Kinko 169	7	
17. (+)	VG	Cap: color of scale	UA: Characteristics 17: without (+)				
PQ	(c)	white			Susono 360, Morino Natsumi, Mori XR1	1	
		brownish			Yujiro, HS607	2	
18. (*) (+)	VG	Gill: shape					
PQ	(c)	apart from stipe			Kinko 115, HS607, KX-S055	1	
		attached to stipe			Morino Natsumi, Mori XR1	2	
19. (*) (+)?	VG	Gill: arrangement of row	UA: Characteristics 19: without (+)				
QL	(c)	straight			Kinko 115, Morino Natsumi, KX-S055	1	
		ripple or crinkle			Akiyama A-526, Mori XR1	2	

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
20.	VG Gill: width					
	(+)					
QN	(c) narrow				Yujiro	3
	medium				Mori 505	5
	wide					7
21.	VG Gill: density					
	(+)					
QN	(c) sparse					1
PQ	intermediate				Yujiro	2
	dense				Kinko 115, Morino Natsumi, KX-S055	3
22.	VG Gill: color					
	(+)					
PQ	(c) white				Kinko 115, Morino Natsumi, Mori XR1	1
	light yellow				HS607, KX-S055	2
	light yellow orange				HS73	3
	light brown					4
23.	VG Stipe: shape					
	(*)					
	(+)					
PQ	(c) cylindrical				Kinko 115, Morino Natsumi, KX-S055	1
QL	thick to upper part				Susono 360	2
	thick to lower part				JMS 7H-1	3

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
24.	MS					
(*)						
(+)						
QN	(c)	very short			Yujiro	1
		short				3
		medium				5
		long			Akiyama A-526	7
		very long				9
25.	MS	Stipe: thickness				
(*)						
(+)						
QN	(c)	thin			Morino Natsumi	3
		medium			HS607	5
		thick				7
26.	VG	Stipe: color				
(*)						
PQ	(c)	white			Mori XR1	1
		brownish			Kinko 115, Morino Natsumi, KX-S055	2
27.	VG	Stipe: fluff	UA: Characteristics 27 explanations are absent but there is a presence of (+)			
(*)						
(+)?						
QL	(c)	absent			Kinko 989	1
		present			Kinko 115, Morino Natsumi, KX-S055	9
28.	VG	Stipe: color of fluff	UA: Characteristics 28 explanations are absent but there is a presence of (+)			
(+)						
PQ	(c)	white			Mori XR1	1
QL		brownish			Kinko 115, Morino Natsumi	2

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
29.	VG	Stipe: hardness		UA: For characteristic 29 is this QL? Solidity or softness? JP: propose to be indicated as PQ		
QN	(c)	soft=>softness				3=>1
PQ		medium =>intermediate			Susono 360, HS607, Mori XR1	5=>2
		hard=>solidity				7=>3
30.	MS	Fruit body: ratio of diameter of cap / length of stipe				
(+)						
QN	(c)	very small			Kinko 610	1
		small			Mori 252	3
		medium			Susono 360, Akiyama A-526	5
		large			Morino Natsumi	7
		very large			Morino Harumitsu	9
31.	MS	Fruit body: ratio of diameter of cap / thickness of stipe		UA: Characteristics 31 explanations are absent but there is a presence of (+)		
(+)						
QN	(c)	very small				1
		small			ML12	3
		medium			JHS KV92	5
		large			Morino Harumitsu	7
		very large			Mori 4T98	9
32.	MS	Fruit body: dry weight				
(+)						
QN	(c)	light			HS73	3
		medium			Susono 360, Akiyama A-526	5
		heavy				7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
33.	MS	Fruit body: ratio of oven-dry weight / fresh weight				
QN	(c)	light			Morino Natsumi	3
		medium				5
		heavy				7
34.	VG	Fruit body: type of fruiting	UA: Characteristics 34 explanations are absent but there is a presence of (+)			
(+)			HU: 34 and 36 is almost the same. We propose to keep 36. and delete 34. If 34 will be kept, explanation is necessary.			
			JP: propose to replace expressions and to add explanation			
PQ	(c)	short term => aggregate			Susono 360, Morino Natsumi, KX-S055	1
		long term => scattering			Yujiro, ML8	2
35.	VG	Fruit body: period from inoculation to fruiting induction	UA: In TQ for characteristics 35 example stains are absent but there is a presence of (+)			
(*)			HU: fruiting induction means appearance of primordium or the start of the temperature reduction (e.g. by water treatment)?			
(+)?			JP: propose to add explanation			
(+)						
QN		short			HS73(S), Kinko 702(B), A-555(B)	3
		medium			HS608(B), S-035(B), Kinko 697(B)	5
		long			Kinko 169(B), Mori-yujiro(B), HS705(S), S-035(S), ML8(S)	7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
36. (+)	VG	Fruit body: period from fruiting induction to harvest	UA: Characteristic 36: presence of asterisk, if it is grouping characteristic in TQ UA: In TQ for characteristics 36 example stains are absent JP: propose to add explanation			
QN	short				KX-S055(B), A-555(B), HS-73(S), S-005(S)	3
	medium				A-526(B), HS72(S), HS705(S)...	5
	long				ML8(B), ML8(S), S-035(S)	7

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) Hyphae and Colony: Hyphae and Colony should be observed by pure cultures.

Type of medium : PDA

Plate : 9cm in inside diameter and 2cm in height

Conditions : in the dark at $25 \pm 2^{\circ}\text{C}$

Observations : (hyphae) developed to 70% of the diameter of the plate
(colony) 14 days after

Number of plate : more than two

- (b) Mycelia: Mycelia should be observed by pure cultures.

Type of medium : PDA

Tube/Plate : growth tube or 9cm in inside diameter and 2cm in height

Conditions : in the dark at specified temperature

Observations : 14 days after [**HU: 14 days also at 10°C?**]

Number of tube : more than five

- (c) Stipe, cap and gills: Unless otherwise indicated, all characteristics of the fruit bodies, the cap, the stipe and the gills should be recorded at harvest maturity (stage 4[see additional information] hand picked mushrooms; freshly harvested).

8.2 *Explanations for individual characteristics*

Ad. 2: Aerial hyphae: development



5
medium

7
strong

3
weak

Observe density and height of aerial hyphae

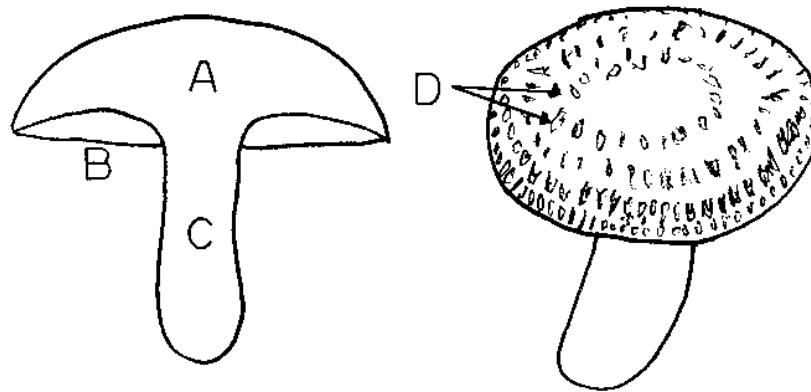
Ad. 4 Mycelia: optimum temperature for growth

Ad. 5, 6, 7, 8, 9: Mycelia: growth rate at 10°C, 15°C, 20°C, 25°C, 30°C

Measure the length [HU: or diameter (see 8.1b tube/plate)] that grew up on the 14th day from the 4th day of mycelia cultured at each temperature. The incubation temperature of mycelia that grow up longest becomes an optimum temperature. Amount of Mycelia growth per day at each temperature are considered to be the growth rate.

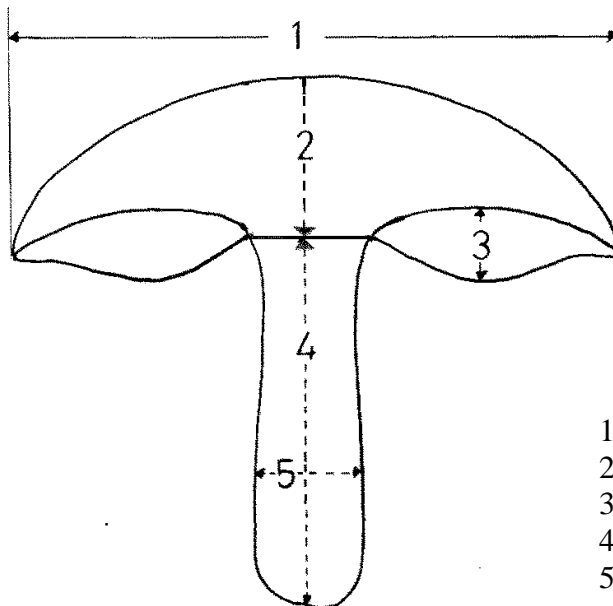
Ad. 10, 11, 13, 14, 15, 16, 18, 19, 20, 21, 23, 24, 25 and 27: Cap, Gill and Stipe

HU: Char.10, 11, 13, 15, 18, 20, 23, 24, 25 has own drawing/photo. It is not necessary the same (e.g. see below). But other drawing is necessary for char.16, 21, 27.



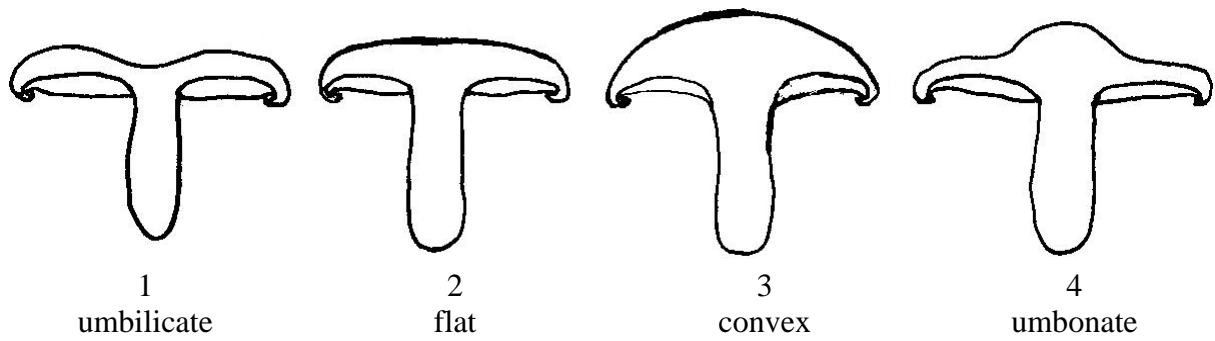
A: Cap B: Gill C: Stipe D: Scale

Ad. 11, 13, 14, 20, 24, 25 and 30: Cap, Gill and Stipe

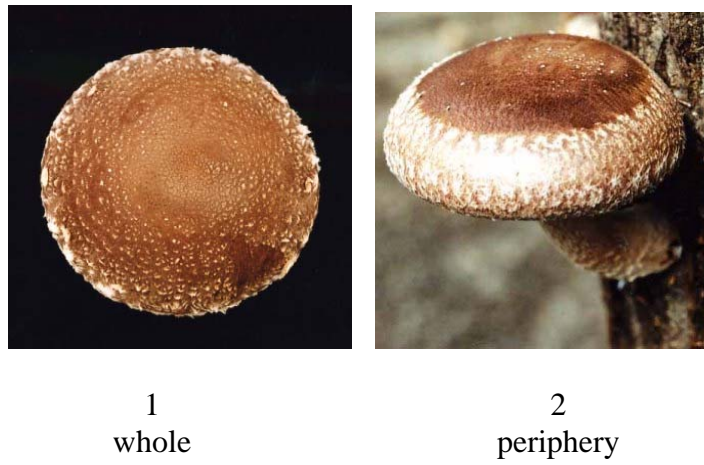


- 1 Cap: diameter
- 2 Cap: thickness
- 3 Gill: width
- 4 Stipe: length
- 5 Stipe: thickness

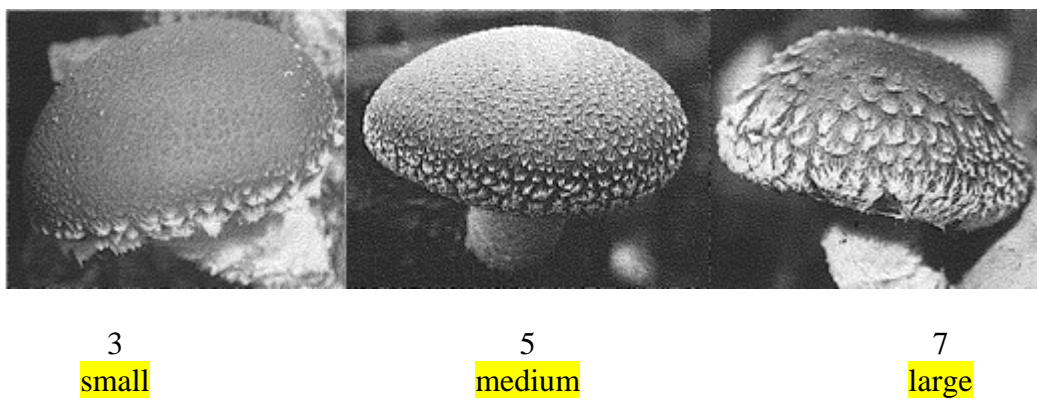
Ad. 10: Cap: shape of vertical section



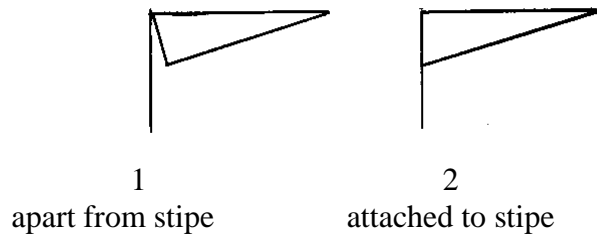
Ad. 15: Cap: distribution of scale



Ad. 16: Cap: size of scale



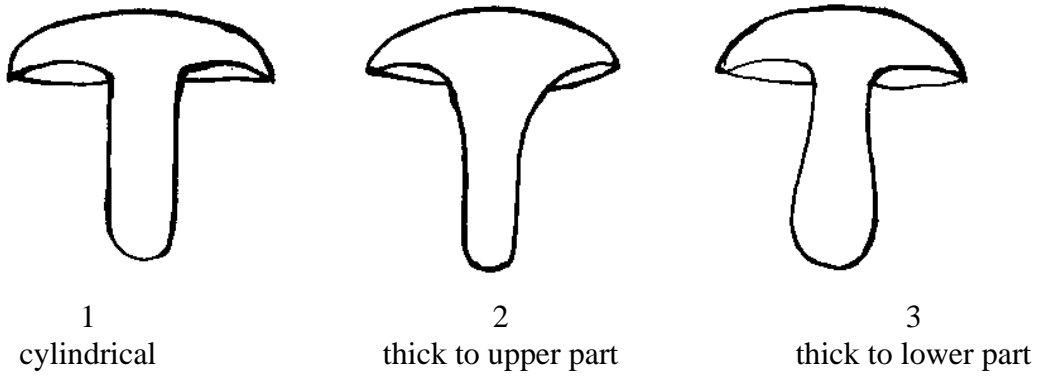
Ad. 18: Gill: shape



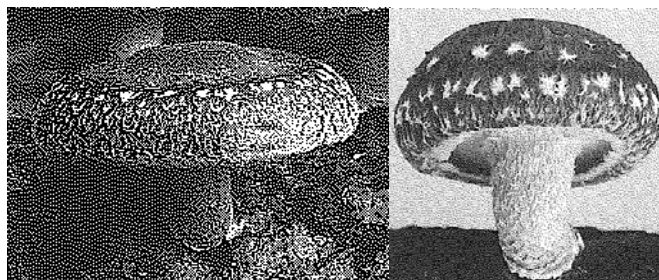
Ad. 21: Gill: density

(The photos are scheduled to be prepared.)

Ad. 23: Stipe: shape



Ad. 27 Stipe: fluff



1
absent

2
present

Ad. 32: Fruit body: dry weight

The fruiting body dries at 60° C until becoming a constant weight.

Ad. 34: Fruit body: type of fruiting

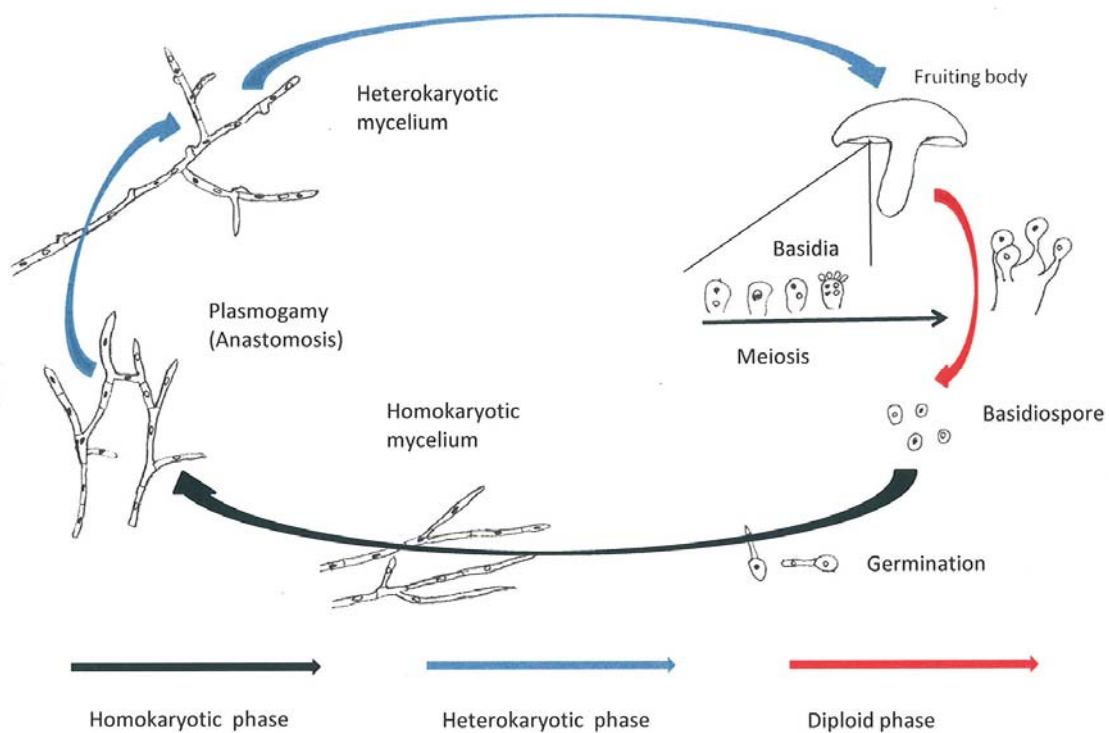
Growth habit of fruiting under suitable cultivated condition. Fruiting are aggregated in a short term or scattered in a long term.

Ad. 35: Fruit body: period from inoculation to fruiting induction

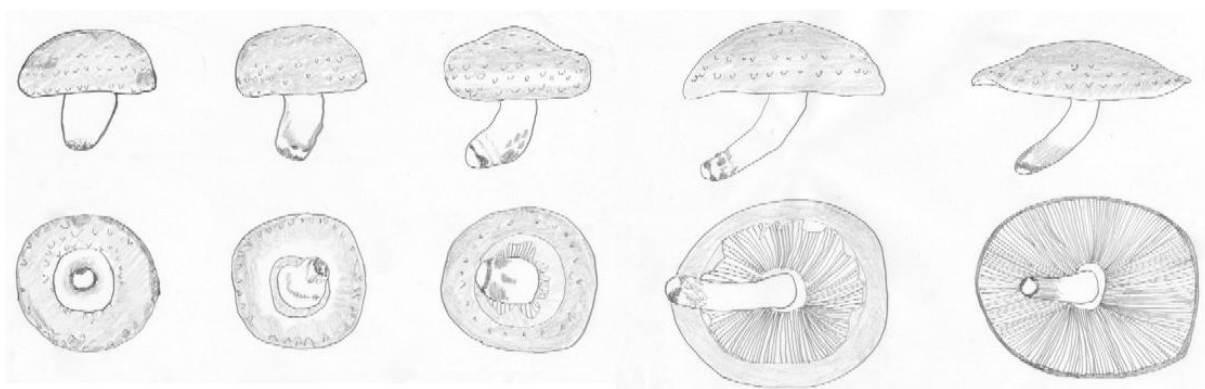
Ad. 36: Fruit body: period from fruiting induction to harvest

In the fruiting induction, there are water soaking treatment, water sprinkling treatment, low temperature treatment, and physical treatment. These methods should be treated at suitable time.

Additional information 1: Life cycle of *Lentinula edodes* (Berk.) Pegler



Additional information 2: Stage of fruit body



1

2

3

4

5

Explanation:

1 and 2 - veil closed 4 - 80 to 90% open / gills visible
3 - veil breaking 5 - fully open

9. Literature

Pegler, D.N., 1975 (1976): The classification of the genus *Lentinus* Fr. (Basidiomycota),
Kavaka 3:11-20

Ministry of Agriculture, Forestry and Fisheries, 1996: National Test Guideline for Shiitake,
JP

Kirk, P.M., Cannon P.F., Minter D.W. and Stalpers J.A. (eds.), 2008: Dictionary of the Fungi
10th edition, CAB International, UK ISBN 978-0-85199-826-8

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	<input type="text" value="Lentinula edodes (Berk.) Pegler"/>	
1.2 Common Name	<input type="text" value="Shiitake"/>	
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"/>	

#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 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)

--

4.2 Method of propagating the variety

4.2.1 Vegetative propagation

- (a) cuttings []
- (b) *in vitro* propagation []
- (c) other (state method) []

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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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. Spawn: cultivation type		
bed-log cultivation type		1[]
saw-dust cultivation type (including both cultivation type)		2[]
5.1 Mycelia: growth at 20°C (7)		
very slow		1[]
very slow to slow		2[]
slow		3[]
slow to medium		4[]
medium	Morino Natsumi	5[]
medium to fast		6[]
fast		7[]
fast to very fast		8[]
very fast		9[]
5.2 Mycelia: growth at 30°C (9)		
very slow		1[]
very slow to slow		2[]
slow		3[]
slow to medium		4[]
medium	Kinko 115	5[]
medium to fast		6[]
fast		7[]
fast to very fast	Morino Natsumi	8[]
very fast		9[]

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics	Example Varieties	Note	
5.3 Cap: shape of vertical section (10)			
umbilicate			1[]
flat			2[]
convex			3[]
umbonate			4[]
5.4 Cap: diameter (11)			
very small			1[]
very small to small			2[]
small	Morino Natsumi		3[]
small to medium			4[]
medium	HS73		5[]
medium to large			6[]
large			7[]
large to very large			8[]
very large			9[]
5.5 Cap: color of upper side (12)			
white	Kirko 989		1[]
yellowish brown	HS73		2[]
brown	Susono 360, HS607		3[]
reddish brown	Akiyama A-526		4[]

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics	Example Varieties	Note	
5.6 Cap: thickness (13)			
very thin		1[]	
very thin to thin		2[]	
thin	Morino Harumitsu	3[]	
thin to medium		4[]	
medium	Susono 360, Morno Natsumi, KX-S055	5[]	
medium to thick		6[]	
thick	Akiyama A-526§	7[]	
thick to very thick		8[]	
very thick		9[]	
5.7 Stipe: shape (23)			
cylindrical		1[]	
thick to upper part		2[]	
thick to lower part		3[]	
UA: The points 5.8 in TQ are not very clear for our experts			
5.8 Zone line of colony: dual culture of mother variety			
absent		1[]	
present		9[]	
5.9 Zone line of colony: dual culture of father variety			
absent		1[]	
present		9[]	
UA: The points 5.10 in TQ are not very clear for our experts			
5.10 Zone line of colony: dual culture of similar variety			
absent		1[]	
present		9[]	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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Characteristics	Example Varieties	Note
UA: In TQ for characteristics 35 example stains are absent		
5.11		
(35) Fruit body: period from inoculation to fruiting induction		
very short		1[]
very short to short		2[]
short	HS73(S), Kinko 702(B), A-555(B)	3[]
short to medium		4[]
medium	HS608(B), S-035(B), Kinko 697(B)	5[]
medium to long		6[]
long	Mori-yujiro(B), HS705(S), S-035(S), ML8(S)	7[]
long to very long		8[]
very long		9[]
UA: In TQ for characteristics 36 example stains are absent		
5.12		
(36) Fruit body: period from fruiting induction to harvest		
very short		1[]
very short to short		2[]
short	KX-S055(B), A-555(B), HS-73(S), S-005(S)	3[]
short to medium		4[]
medium	ML8(B), ML8(S), S-035(S)	5[]
medium to long		6[]
long	ML8(B), ML8(S), S-035(S)	7[]
long to very long		8[]
very long		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>To be provided</i>	<i>To be provided</i>	<i>To be provided</i>

Comments:

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
<p>#7. Additional information which may help in the examination of the variety</p> <p>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?</p> <p>Yes [] No []</p> <p>(If yes, please provide details)</p> <p>7.2 Are there any special conditions for growing the variety or conducting the examination?</p> <p>Yes [] No []</p> <p>(If yes, please provide details)</p> <p>7.3 Other information</p> <p>7.3.1 Main type of cultivation</p> <p>(a) log cultivation []</p> <p>(b) sawdust cultivation []</p>		
<p>8. Authorization for release</p> <p>(a) Does the variety require prior authorization for release under legislation concerning the protection of the environment, human and animal health?</p> <p>Yes [] No []</p> <p>(b) Has such authorization been obtained?</p> <p>Yes [] No []</p> <p>If the answer to (b) is yes, please attach a copy of the authorization.</p>		

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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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 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]