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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

DRAFT

SHIITAKE

UPOV Code:

Lentinula edodes (Berk.) Pegler

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-third session, to be held in Beijing, from April 20 to 24, 2009*

Alternative Names:*

<i>Latin</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Lentinula edodes</i> (Berk.) Pegler	Shiitake			

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 *Lentinula edodes* (Berk.) Pegler (Marasmiaceae).

2. Material Required

2.1 The competent authorities decide on the quantity and quality of the fungal 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 litre of spawn and 5 slant tubes containing a pure culture

2.4 Spawn should not be older than 6 months.

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

2.6 The fungal 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 *Duration of Tests*

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

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 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.

3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least 100 wood logs or 100 sawdust blocks, which should preferably be divided between two or more 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 *Number of fruit bodies / Parts of fruit bodies to be Examined*

Unless otherwise indicated, all observations should be made on 100 fruit bodies or parts taken from each of 100 fruit bodies per replicate.

3.6 *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.

4.2 *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 100 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 tested, either by growing a further generation, or by testing a new stock to ensure that it exhibits the same characteristics as those shown by the previous 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) Mycelia: growth at 20°C (characteristic 9)
- (b) Mycelia: growth at 30°C (characteristic 11)
- (c) Cap: shape of vertical section (characteristic 12)
- (d) Cap: diameter (characteristic 13)
- (e) Cap: color of upper side (characteristic 14)
- (f) Cap: thickness (characteristic 15)
- (g) Stipe: shape (characteristic 25)
- (h) Only varieties log cultivation type: Optimum season of harvest on natural cultivation (characteristic 37)

- (i) Only varieties log cultivation type: Optimum season of harvest by soaking (characteristic 38)
- (j) Only varieties sawdust cultivation type: Period from inoculation to fruiting induction (characteristic 41)
- (k) Only varieties sawdust cultivation type: Period from fruiting induction to harvest (characteristic 42)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the General Introduction.

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*

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.

6.3 *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 3.3.2

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

(+) See Explanations on the Table of Characteristics in Chapter 8.2.

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

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
1. MG	Hyphae: density					
QN	(a) sparse				HS607, Mori XR1	1
	medium				Morino Natsumi	2
	dense				KX-S055	3
<i>UA: change notes for stages of expressions: sparse(3), medium(5) and dense(7)</i>						
2. MG	Aerial hyphae: development					
QN	(a) weak				HS607	1
	medium				KX-S055, Morino Natsumi	2
	strong					3
<i>UA: change expressions: weak(3), strong(7)</i>						
3. VG	Hyphae: tunicate					
(*)						
QL	(a) absent				Morino Natsumi, Mori XR1	1
	present				KX-S055, HS607, Susono 360	9
<i>UA: tunicate always present, to add stages of expression or delete this characteristic?</i>						
<i>- We can observe both stages at condition (a). And this characteristic means resistance to disease.</i>						
4. VG	Colony: color of surface					
(*)						
PQ	(a) white				Morino Natsumi, Mori XR1	1
	brownish				KX-S055, HS607	2

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota	
5.	MS	Mycelia: optimum temperture for growth					
(*)							
QN	(b)	Lower than 24°C				1	
		24°C				2	
		25°C			HS607, Kinko 115, Mori XR1	3	
		26°C			KX-S055	4	
		higher than 26°C			Morino Natsumi	5	

KR: This character is very small interval. In case of this measurement, the value can be made the same between intervals. Or, it can not find different at the statistical analysis. Moreover, the vale difference may break out from observer or equipment and so on. Larger interval(2'') is better than that(1'').

6.	MS	Mycelia: growth at 5°C					
(*)							
QN	(b)	slow			Kinko 115	1	
		medium			HS607, Susono 360	2	
		fast			Morino Natsumi, Yujiro	3	

UA: combine 6 characteristic(from 6 to 11) into one

- It is impossible. Response of varieties for growth at different temperature are not parallel. And these characteristics mean the reaction of variety to the different environmental condition.

KR: This character needs to seek the difference between cultivars. But, actually, this character demands very similar characters and repeated processes. Many characters for mycelia growth does not need. Because temperature ranges for mycelial growth of shiitake is very important between 20'' to 30''.

7.	MS	Mycelia: growth at 10°C					
(*)							
QN	(b)	slow				1	
		medium			HS607	2	
		fast			KX-S055	3	

8.	MS	Mycelia: growth at 15°C					
(*)							
QN	(b)	slow				1	
		medium			HS607, Susono 360	2	
		fast			Yujiro	3	

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
9.	MS					
(*)						
QN	(b)					1
						2
					Morino Natsumi	3
						4
						5
10.	MS					
(*)						
QN	(b)					1
						2
					HS73, Susono 360	3
						4
						5
11.	MS					
(*)						
QN	(b)					1
						2
					Kinko 115	3
					Mori XR, Susono 360	4
					Morino Natsumi	5
12.	VG					
(*)						
(+)						
PQ	(c)					1
						2
						3
						4
						5

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota	
13.	VG	Cap: diameter					
(*)							
(+)	(c)	small			Morino Harumitsu	1	
PQ		small to medium			Morino Natsumi	2	
		medium			HS73	3	
		medium to large			HS607	4	
		large				5	

UA: change notes for stages of expressions: small to medium(3), medium(5), medium to large(7), large(9)

14.	VG	Cap: color of upper side					
(*)							
PQ	(c)	white			Kinko 989	1	
		yellowish brown			HS73	2	
		brown			HS607, Susono 360	3	
		reddish brown			Akiyama A-526	4	

15.	MS	Cap: thickness					
(*)							
(+)							
QN	(c)	thin				1	
		thin to medium			Morino Harumitsu	2	
		medium			KX-S055, Morino Natsumi, Susono 360	3	
		medium to thick			Akiyama A-526	4	
		thick				5	

UA: change notes for stages of expressions: thin to medium(3), medium(5), medium to thick(7), thick(9)

16.	VS	Cap: hardness					
QN	(c)	soft				1	
		medium			KX-S055, HS607, Susono 360	2	
		hard			Akiyama A-526	3	

UA: change notes for stages of expressions: soft to medium(3), medium(5), medium to hard(7), hard(9)

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota	
17.	VG	Cap: distribution of scale					
(*)							
(+)							
QL	(c)	whole			Akiyama A-526	1	
		periphery			KX-S055, Morino Natsumi, Susono 360	2	
18.	VG	Cap: size of scale					
(+)							
QN	(c)	small			HS73	1	
		medium			Susono 360, Morino Natsumi	2	
		large				3	
<i>UA: change notes for stages of expressions: small(3), medium(5), large(7)</i>							
19.	VG	Cap: color of scale					
(+)							
PQ	(c)	white			Susono 360, Morino Natsumi, Mori XR1	1	
		brownish			HS607, Yujiro	2	
20.	VG	Gill: shape					
(*)							
(+)							
PQ	(c)	apart from stipe			HS607, Kinko 115, KX-S055	1	
		attached to stipe				2	
21.	VG	Gill: system of row					
(*)							
(+)							
QL	(c)	straight			Kinko 115, KX-S055, Morino Natsumi	1	
		ripple or crinkle			Akiyama A-526, Mori XR1	2	

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
22.	VG Gill: width					
	(+)					
QN	(c) narrow					1
	narrow to medium					2
	medium					3
	medium to wide					4
	wide					5
<i>UA: to delete stages of expressions: narrow to medium(2), medium to wide(4); and change notes for stages of expressions, narrow(3), medium(5), wide(7)</i>						
23.	VG Gill: density					
	(+)					
QN	(c) sparse					1
	medium				Yujiro	2
	dense				Kinko 115, KX-S055, Morino Natsumi	3
<i>UA: change notes for stages of expressions: sparse(3), medium(5), dense(7)</i>						
24.	VG Gill: color					
	(+)					
PQ	(c) white				Kinko 115, Morino Natsumi, Mori XR1	1
	cream				HS607, KX-S055	2
	light yellow orange				HS73	3
	light brown					4
25.	VG Stipe: shape					
	(*)					
	(+)					
PQ	(c) cylindrical				Kinko 115, KX-S055, Morino Natsumi	1
	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
26.	MS					
	Stipe: length					
	(*)					
	(+)					
QN	(c)					
	very short				Yujiro	1
	very short to short				Morino Natsumi	2
	short					3
	short to medium					4
	medium					5
	medium to long				HS607	6
	long				Akiyama A-526	7
<i>UA: to delete stages of expressions: very short to short(2), short to medium(4), medium to long(6)</i>						
27.	MS					
	Stipe: thickness					
	(*)					
	(+)					
QN	(c)					
	thin				Morino Natsumi	1
	thin to medium				Mori XR1	2
	medium				HS607	3
	medium to thick				Yujiro	4
	thick					5
<i>UA: to delete stages of expressions: thin to medium(2), medium to thick(4); and change notes for stages of expressions, thin(3), medium(5), thick(7)</i>						
28.	VG					
	Stipe: color					
	(*)					
PQ	(c)					
	white				Mori XR1	1
	brownish				Kinko 115, KX-S055, Morino Natsumi	2
29.	VG					
	Stipe: fluff					
	(*)					
	(+)					
QL	(c)					
	absent				Kinko 989	1
	present				Kinko 115, KX-S055, Morino Natsumi	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota	
30.	VG	Stipe: color of fluff					
	(+)						
PQ	(c)	white			Mori XR1	1	
		brownish			Kinko 115, Morino Natsumi	2	
31.	MG	Stipe: hardness					
QN	(c)	soft				1	
		medium			HS607, Mori XR1, Susono 360	2	
		hard				3	
<i>UA: to delete stages of expressions: soft to medium(2), medium to hard(4); and change notes for stages of expressions, soft(3), medium(5), hard(7)</i>							
32.	MS	Fruit body: ratio of diameter of cap / length of stipe					
	(+)						
QN	(c)	very small			Kinko 610	1	
		small			Mori 252	3	
		medium			Akiyama A-526, Susono 360	5	
		large			Morino Natsumi	7	
		very large			Morino Harumitsu	9	
33.	MS	Fruit body: ratio of diameter of cap / thickness of stipe					
	(+)						
QN	(c)	very small				1	
		small			ML12	3	
		medium			JHS KV92	5	
		large			Morino Harumitsu	7	
		very large			Mori 4T98	9	

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota	
34.	MS	Only varieties log cultivation type: Fruit body: ratio of oven-dry weight / fresh weight					
QN	(c)	light				1	
		medium				3	
		heavy				5	

Fruit body: water quantity instead of ratio of dry weight to fresh weight; and change notes for stages of expressions: few(3), medium(5), many(7)

When there is same difference, dry matter quantity is more remarkable than water quantity.

35.	MS	Only varieties log cultivation type: Fruit body: dry weight					
QN	(c)	very light				1	
		light			HS73	3	
		medium			Akiyama A-526, Susono 360	5	
		heavy				7	
		very heavy				9	

UA: to delete

average of dry weight of a fruit body at degree of moisture of 8% (the fresh weight moisture content)

36.	VG	Fruit body: type of fruiting					
(+)							
PQ	(c)	aggregate			KX-S055, Morino Natsumi, Susono 360	1	
		scattering			ML8, Yujiro	2	

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
37. VG	<u>Only varieties log</u>					
(*)	<u>cultivation type:</u>					
	Optimum season of					
	harvest on natural					
	cultivation					
PQ	spring				Kinko 115	1
	spring/autumn				Susono 360	2
	autumn/spring					3

UA: to add explanations

38. VG	<u>Only varieties log</u>					
(*)	<u>cultivation type:</u>					
	Optimum season of					
	harvest by soaking					
PQ	summer/autumn				Morino Natsumi	1
	autumn/winter					2
	unseasonable				HS607	3

UA: to add explanations

39. VG	Availability of					
(*)	soaking for flush					
QL	not available				Susono 360	1
	available				Morino Natsumi, Mori XR1	9

KR: We use sprinkle and/or mist instead of soaking.

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota	
40.	MG	<u>Only varieties log cultivation type:</u>					
(*)		<u>Period from inoculation to first flush with fruiting induction</u>					
(+)							
QN	short					1	
	short to medium					2	
	medium					3	
	medium to long					4	
	long					5	

UA: to delete stages of expressions: short to medium(2), medium to long(4); and change notes for stages of expressions, short(3), medium(5), long(7)

KR: Need to standard

41.	VG	<u>Adaptability to kind of wood</u>					
QL		<u>broadleaf wood</u>					1
		<u>conifer</u>					2
		<u>mixture</u>					3

UA: to delete

KR: Generally, shiitake cultivation uses basically oak tree and sawdust as a substrate. Why contain conifer? Is there popular using conifer substrate for shiitake cultivation in Japan?

41.	MG	<u>Only varieties sawdust cultivation type:</u>					
(*)		<u>Period from inoculation to fruiting induction</u>					
(+)							
QN	short					1	
	short to medium					2	
	medium					3	
	medium to long					4	
	long					5	

UA: to delete stages of expressions: short to medium(2), medium to long(4); and change notes for stages of expressions, short(3), medium(5), long(7)

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
42.	MG <u>Only varieties sawdust cultivation</u> type: Period from fruiting induction to harvest					
QN	short				KX-S055	3
	medium					5
	long				ML8	7
43.	VG <u>Only varieties sawdust cultivation</u> type: Method of fruiting induction after the 1st flushing					
PQ	soaking				Mori XR1	1
	sprinkle					2
	soaking/sprinkle				KX-S055	3

UA: to delete

KR: This character is not suitable for TG because of difference of cultivation method and dependant upon cultivator condition or fondness.

8. Explanations on the Table of Characteristics

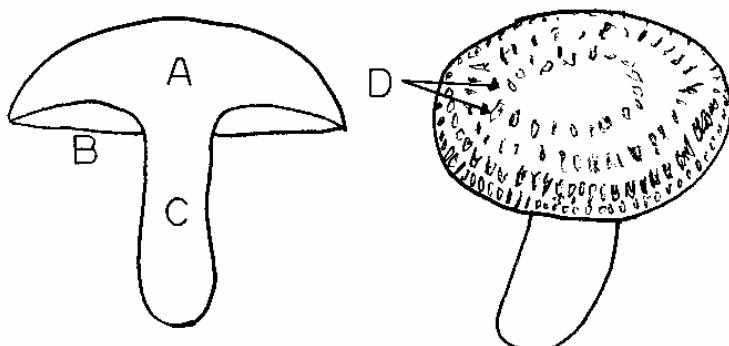
8.1 *Explanations covering several characteristics*

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
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).

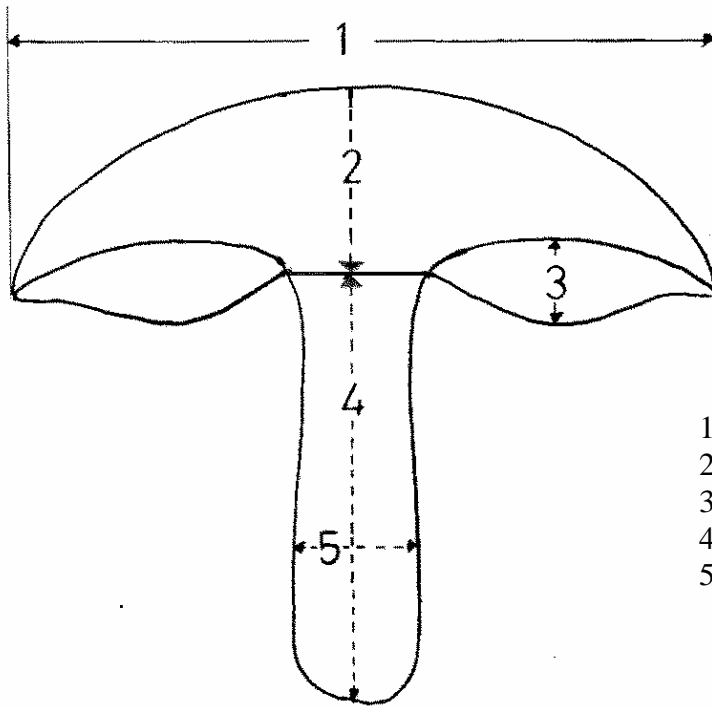
8.2 *Explanations for individual characteristics*

Ad. 12, 13, 15, 17, 18, 19, 20, 21, 22, 25, 26, 27, 28: Cap, Gill and Stipe



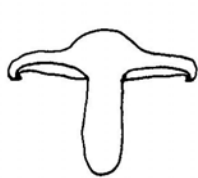
A : Cap B : Gill C : Stipe D : Scale

Ad. 13, 15, 22, 26, 27, 32 and 33: Cap, Gill and Stipe



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

Ad. 12: Cap: shape of vertical section



1
umbonate



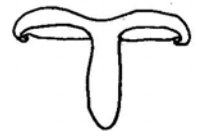
2
round



3
convex



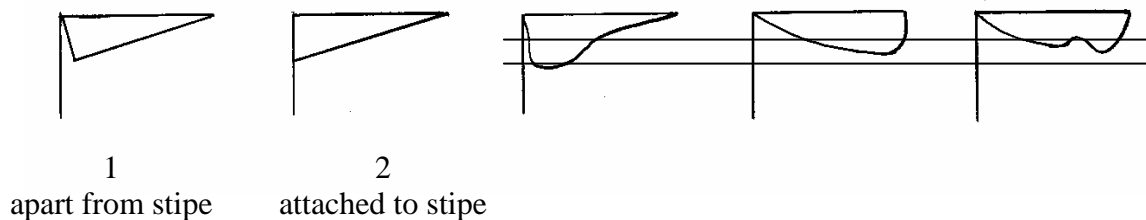
4
flat



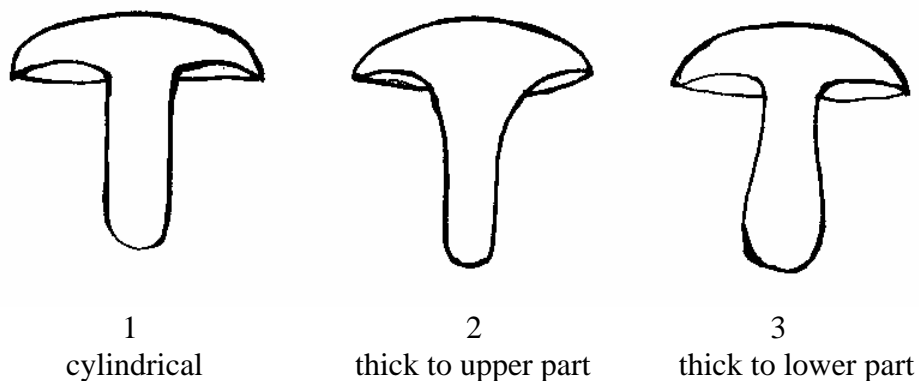
5
umbilicate

Ad. 17: Cap: distribution of scale
It is necessary to prepare pictures.

Ad. 20: Gill: shape



Ad. 25: Stipe: shape



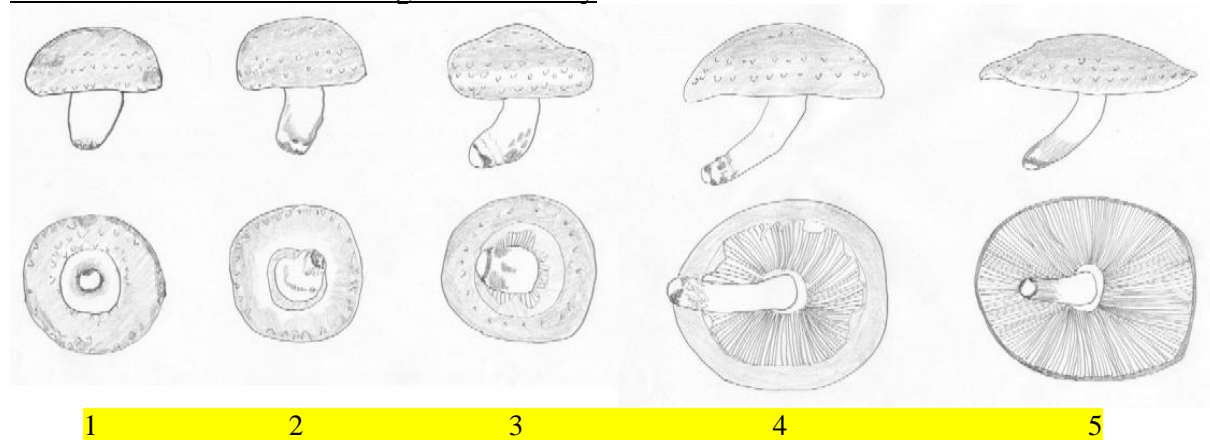
Ad. 37: Optimum season of harvest on natural cultivation

Explanation required

Ad. 38: Optimum season of harvest by soaking

Explanation required

Additional information 1: Stage of fruit body

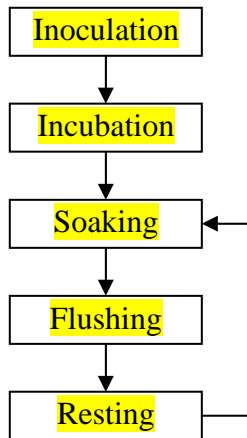


Explanation: 1 and 2 - veil closed 4 - 80 to 90% open / gills visible
 3 - veil breaking 5 - fully open

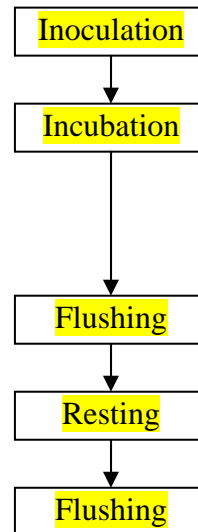
Additional information 2: Growing cycle of shiitake

log cultivation type

(with fruiting induction)

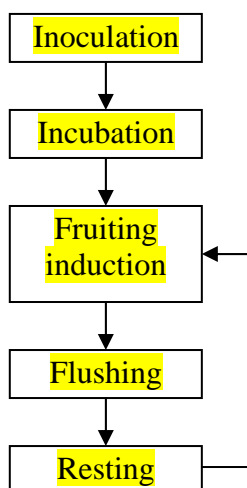


(natural cultivation)



log: *Quercus* L. or *Betula* L.
diameter 10 – 12cm, length 1m
number of inoculation hole 20 (diameter is 10cm)
inoculation: February to April

sawdust cultivation type



It is necessary to add explanations for sawdust cultivation.

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

Paul M Kirk, Paul F Cannon, David W Minter and Joost A Stalpers (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"/>	

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)

4.2 Method of propagating the variety

4.2.1 Vegetative propagation

(a) cuttings []

(b) *in vitro* propagation []

(c) other (state method) []

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 Mycelia: growth at 20°C (9)		
slow		1[]
slow to medium		2[]
medium	Morino Natsumi	3[]
medium to fast		4[]
fast		5[]
5.2 Mycelia: growth at 30°C (11)		
slow		1[]
slow to medium		2[]
medium	Kinko 115	3[]
medium to fast	Susono 360, Mori XR1	4[]
fast	Morino Natsumi	5[]
5.3 Cap: shape of vertical section (12)		
umbonate		1[]
round		2[]
convex		3[]
flat		4[]
umbilicate		5[]

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics		Example Varieties	Note
5.4 Cap: diameter (13)			
small		Morino Harumitsu	1[]
small to medium		Morino Natsumi	2[]
medium		HS73	3[]
medium to large		HS607	4[]
large			5[]
5.5 Cap: color of upper side (14)			
white		Kinko 989	1[]
yellowish brown		HS73	2[]
brown		HS607, Susono 360	3[]
reddish brown		Akiyama A-526	4[]
5.6 Cap: thickness (15)			
thin			1[]
thin to medium		Morino Harumitsu	2[]
medium		KX-S055, Morino Natsumi, Susono 360	3[]
medium to thick		Akiyama A-526	4[]
thick			5[]
5.7 Stipe: shape (25)			
cylindrical		Kinko 115, KX-S055, Morino Natsumi,	1[]
thick to upper part		Susono 360	2[]
thick to lower part		JMS 7H-1	3[]
5.8 Zone line of colony: dual culture of mother variety			
absent			1[]
present			9[]

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics	Example Varieties	Note	
5.9 Zone line of colony: dual culture of father variety			
absent		1[]	
present		9[]	
5.10 Zone line of colony: dual culture of similar variety			
absent		1[]	
present		9[]	
5.11 <u>Only varieties log cultivation type: Optimum season of harvest on natural cultivation</u> (37)			
spring	Kinko 115	1[]	
spring/autumn	Susono 360	2[]	
autumn/spring		3[]	
5.12 <u>Only varieties log cultivation type: Optimum season of harvest by soaking</u> (38)			
summer/autumn	Morino Natsumi	1[]	
autumn/winter		2[]	
unseasonable	HS607	3[]	
5.13 <u>Only varieties sawdust cultivation type: Period from inoculation to fruiting induction</u> (41)			
short		1[]	
short to medium		2[]	
medium		3[]	
medium to long		4[]	
long		5[]	
5.14 <u>Only varieties sawdust cultivation type: Period from fruiting induction to harvest</u> (42)			
short	KX-S055	3[]	
medium		5[]	
long	ML8	7[]	

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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Characteristics	Example Varieties	Note
5.15 Optimum temperature of soaking		
<p>KR: Soaking process for shiitake cultivation provides fruiting medium with water supply. And, actually, cultivation of Korea usually use tap water or/and underground water. So, uniformed water temperature is not use now in Korea. Probably, in case of Japanese style may suitable using this method. But that of Korea does not suitable.</p>		
lower than 10°C		1[]
10°C to 14°C		2[]
15°C to 19°C		3[]
20°C to 24°C		4[]
higher than 24°C		5[]
5.16 Optimum temperature for fruit body flushing		
lower than 10°C		1[]
10°C to 14°C		2[]
15°C to 19°C		3[]
20°C to 24°C		4[]
higher than 25°C		5[]

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
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Example

#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

7.3.1 Main type of cultivation

(a) log cultivation []

(b) sawdust cultivation []

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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8. Authorization for release

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

Yes [] No []

(b) Has such authorization been obtained?

Yes [] No []

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

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

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

9.2 The 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]