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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

Geneva

DRAFT

LOTUS

UPOV Code(s): NELUM

Nelumbo Adans.

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

*prepared by experts from China
to be considered by the
Technical Working Party for Ornamental Plants and Forest Trees
at its fifty-sixth session, to be held virtually
from 2024-04-29 to 2024-05-02*

Disclaimer: this document does not represent UPOV policies or guidance

Alternative names:*

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
<i>Nelumbo</i> Adans.	Lotus		Lotus	

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 *Nelumbo Adans.*

2. Material Required

- 2.1 The competent authorities decide on the quantity and quality of the plant material required for testing the variety and when and where it is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must ensure that all customs formalities and phytosanitary requirements are complied with.
- 2.2 The material is to be supplied in the form of rhizome propagules or seed.
- 2.3 The minimum quantity of plant material, to be supplied by the applicant, should be:

12 rhizome propagules to meet at least 10 survivals after planting.
15 seeds to meet at least 10 survivals after germination and planting.

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

In the case of rhizome propagule, a standard propagule (meeting market requirement) should be fresh and healthy, and each should have two internodes with healthy shoot



A standard propagule with two expanded internodes

In the case of seed, the applicant should guarantee the seeds to meet the requirement for purity, maturity and high germination capacity.

- 2.4 The plant material supplied should be visibly healthy, not lacking in vigor, nor affected by any important pest or disease.
- 2.5 The plant material should not have undergone any treatment which would affect the expression of the characteristics of the variety, unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

3. Method of Examination

3.1 *Number of Growing Cycles*

- 3.1.1 The minimum duration of tests should normally be a single growing cycle.
- 3.1.2 The testing of a variety may be concluded when the competent authority can determine with certainty the outcome of the test.

3.2 *Testing Place*

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

3.3 *Conditions for Conducting the Examination*

- 3.3.1 The tests should be carried out under conditions ensuring satisfactory growth for the expression of the relevant characteristics of the variety and for the conduct of the examination.
- 3.3.2 The optimum stage of development for the assessment of each characteristic is indicated by a number in the Table of Characteristics. The stages of development denoted by each number are described in Chapter 8.
- 3.3.3 Because daylight varies, color determinations made against a color chart should be made either in a suitable cabinet providing artificial daylight or in the middle of the day in a room without direct sunlight. The spectral distribution of the illuminant for artificial daylight should conform with the CIE Standard of Preferred Daylight D 6500 and should fall within the tolerances set out in the British Standard 950, Part I. These determinations should be made with the plant part placed against a white background. The color chart and version used should be specified in the variety description.
- 3.3.4 Based on its main use, the lotus is usually divided into three types, namely rhizome lotus (producing underground expanded rhizome for vegetable), seed lotus (producing seeds for food or medicine), and ornamental lotus (also called flower lotus for ornamental plant).

Except the characteristics shared by these three types of lotus, there are some specified characteristics for each type of them. The seed lotus can also be treated as ornamental plant because it produce numerous flowers which are usually used in wetland landscape.

3.4 *Test Design*

- 3.4.1 In the case of rhizome propagated varieties, each test should be designed to result in a total of at least 10 plants.
- 3.4.2 In the case of seed propagated varieties, each test should be designed to result in a total of at least 10 plants.
- 3.4.3 The design of the tests should be such that plants or parts of plants may be removed for measurement or counting without prejudice to the observations which must be made up to the end of the growing cycle.
- 3.4.4 During growth season, some of the flowers and mature fruits will be collected for counting or measurement, but it has no influence on plant development and growth. At the end of growth cycle, the underground rhizomes will be harvested for observation of shoot shape, measurement of expanded rhizome diameter and counting of propagule number during dormancy or before planting.

3.5 *Additional Tests*

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

4. Assessment of Distinctness, Uniformity and Stability

4.1 *Distinctness*

4.1.1 General Recommendations

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

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

- (i) description of parent lines according to the Test Guidelines;
- (ii) check of the originality of the parent lines in comparison with the variety collection, based on the characteristics in Chapter 7, in order to identify similar parent lines;
- (iii) check of the originality of the hybrid formula in relation to the hybrids in the variety collection, taking into account the most similar lines; and

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

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

4.1.2 Consistent Differences

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

4.1.3 Clear Differences

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

4.1.4 Number of Plants or Parts of Plants to be Examined

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

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

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

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

4.1.5 Method of Observation

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

MG: single measurement of a group of plants or parts of plants

MS: measurement of a number of individual plants or parts of plants

VG: visual assessment by a single observation of a group of plants or parts of plants

VS: visual assessment by observation of individual plants or parts of plants

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

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

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

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

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

4.2 *Uniformity*

- 4.2.1 It is of particular importance for users of these Test Guidelines to consult the General Introduction prior to making decisions regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines:
- 4.2.2 These Test Guidelines have been developed for the examination of 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 The assessment of uniformity for seed-propagated varieties should be according to the recommendations for cross-pollinated varieties in the General Introduction.
- 4.2.4 The assessment of uniformity for hybrid varieties depends on the type of hybrid and should be according to the recommendations for hybrid varieties in the General Introduction.
- 4.2.5 For the assessment of uniformity of seed-propagated varieties, a population standard of 5% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 10 plants, 1 off-type is allowed.

4.3 *Stability*

- 4.3.1 In practice, it is not usual to perform tests of stability that produce results as certain as those of the testing of distinctness and uniformity. However, experience has demonstrated that, for many types of variety, when a variety has been shown to be uniform, it can also be considered to be stable.
- 4.3.2 Where appropriate, or in cases of doubt, stability may be further examined by testing a new seed or plant 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) Plant: height (characteristic 1)
 - (b) Emerging leaf: texture of adaxial surface (characteristic 8)
Leaf: texture of blade
 - (c) Flower: position relative to leaf (characteristic 19)
Flower: position in relation to leaf
 - (d) Flower: type (characteristic 22)
 - (e) Flower: shape (characteristic 23)
 - (f) Flower: color group (characteristic 24)
 - (g) Carpel: status of development (characteristic 41)
 - (h) Expanded rhizome: thickness (characteristic 60)
 - (i) Main expanded rhizome: shape of internode (characteristic 62)
- 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 All relevant states of expression are presented in the characteristic.

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)-(b) 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	MS A/VG	(+)	30			
	Plant: height						
		very short				Nelumbo `Chuzi Luo`	1
		very short to short					2
		short				Nelumbo `Xing Huo`	3
		short to medium					4
		medium				Nelumbo `Yijian Lian`	5
		medium to tall					6
		tall				Nelumbo lutea `Yellow Bird`	7
		tall to very tall					8
		very tall				Nelumbo nucifera `Fen Bawang`	9
2.	QN	MG/VG	(+)	30			
	Emerging leaf: number						
		absent				Nelumbo `Ai Xiangsi Hong`	1
		very few				Nelumbo `Jin Fuwa`	2
		few				Nelumbo nucifera `Zhongshan Hongtai`	3
		medium				Nelumbo nucifera `Honghu Hong`	4
		many				Nelumbo nucifera `Qian Ban`	5
		very many				Nelumbo `Hong Sijuan`	6
3. (*)	QN	MS/VG		30			
	Emerging leaf: size of blade						
		very small				Nelumbo `Chuzi Luo`	1
		very small to small					2
		small				Nelumbo `Yanzhi Wan`	3
		small to medium					4
		medium				Nelumbo `Jiuhua Haoyue`	5
		medium to large					6
		large				Nelumbo nucifera `Qian Ban`	7
		large to very large					8
		very large				Nelumbo nucifera `Fen Bawang`	9

	English		français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
4. (*)	QL	VG	(+)	20-30			
	Leaf: variegation of blade						
	absent					Nelumbo `Cai Xia`	1
	present					Nelumbo `Furong Sajin`	9
5. (*)	PQ	VG	(+)	20-30			
	Emerging leaf: main color of blade						
	light or medium green						1
	dark green					Nelumbo lutea `Yellow Bird`	2
	yellow green					Nelumbo nucifera `Baiyangdian Bai`	3
6. (*)	PQ	VG	(+)	20-30			
	Emerging leaf: shape of blade						
	rounded or nearly rounded					Nelumbo lutea `Yellow Bird`	1
	elliptic						2
	narrow elliptic						3
7. (*)	PQ	VG	(+)	20-30			
	Emerging leaf: attitude of blade						
	strongly concave						1
	moderately concave					Nelumbo nucifera `Dan Sajin`	2
	weakly concave						3
	flat					Nelumbo `Jia Jingying`	4
	concave center with dropping edge					Nelumbo nucifera `Elian 1`	5
8. (*)	QN	VG	(+)	20-30			
	Emerging leaf: texture of adaxial surface						
	very rough					Nelumbo nucifera `Daye Chi`	1
	rough					Nelumbo nucifera `Honghu Hong`	2
	medium						3
	smooth					Nelumbo nucifera `Fenhong Lingxiao`	4
	very smooth					Nelumbo lutea `Yellow Bird`	5

	English		français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
9.	PQ	VG	(+)	20-30			
	Emerging leaf: upper margin of blade						
	rounded						1
	weakly concave					Nelumbo `Honghe Zhanchi`	2
	moderately concave					Nelumbo `Danban Jinxia`	3
	strongly concave						4
10 (*)	QL	VG	(+)	20-30			
	Emerging leaf: red line of margin						
	absent						1
	present						9
11	QN	MG/VG	(+)	20-40			
	Leaf nose: gap						
	absent or very narrow					Nelumbo `Jia Jingying`	1
	narrow					Nelumbo nucifera `Honghu Hong`	2
	medium					Nelumbo `Yijian Lian`	3
	broad						4
12	QN	MG	(+)	30			
	Petiole: thickness						
	very thin					Nelumbo `Chuzi Luo`	1
	thin					Nelumbo `Hong Sijuan`	2
	medium						3
	thick					Nelumbo nucifera `Honghu Hong`	4
	very thick					Nelumbo nucifera `Fen Bawang`	5
13	QN	VG	(+)	20-40			
	Petiole: density of spines						
	absent or very sparse					Nelumbo lutea `Yellow Bird`	1
	sparse					Nelumbo `Bian Lian`	2
	medium					Nelumbo nucifera `Honghu Hong`	3
	dense					Nelumbo `Jia Jingying`	4

	English		français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
14	(*)	PQ	VG	(+)	20-30		
		Flower bud: shape					
		globose				Nelumbo 'Xiao Hong Dan'	1
		ellipsoid				Nelumbo `Jin Fuwa`	2
		ovoid				Nelumbo nucifera `Fenhong Lingxiao`	3
		conic				Nelumbo nucifera `Dan Sajin`	4
		narrow conic				Nelumbo `Tan Kong`	5
15	(*)	PQ	VG		20-30		
		Flower bud: color					
		green				Nelumbo nucifera `Baiyangdian Bai`	1
		green with purple-red edge				Nelumbo `Furong Qipa`	2
		green yellow					3
		green red				Nelumbo `Jiangnan Mingzhu`	4
		purple red				Nelumbo nucifera `Zhongshan Hongtai`	5
		grey purple				Nelumbo `Yinxiang Xihu`	6
16	(*)	QN	VG	(a)	30		
		Flowering: time of starting to bloom					
		early				Nelumbo `Jiuhua Haoyue`	1
		medium				Nelumbo nucifera `Honghu Hong`	2
		late				Nelumbo nucifera `Fenhong Lingxiao`	3
17	(*)	QN	MG		30		
		Flowering time					
		very short					1
		short					2
		medium				Nelumbo `Yijian Lian`	3
		long				Nelumbo `Bian Lian`	4
		very long				Nelumbo nucifera `Fenhong Lingxiao`	5

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
18 (*)	QN	MS/VG			30	
	Flower: number					
	absent or very few				Nelumbo nucifera `Elian 1`	1
	few				Nelumbo `Bo Ai`	2
	medium				Nelumbo nucifera `Zhongshan Hongtai`	3
	many				Nelumbo `Hong Sijuan`	4
	very many				Nelumbo `Xing Huo`	5
19 (*)	QN	VG	(+)		30	
	Flower: position relative to leaf					
	below					1
	same level				Nelumbo nucifera `Zhongshan Hongtai`	2
	slightly above				Nelumbo `Hong Sijuan`	3
	moderately above				Nelumbo nucifera `Honghu Hong`	4
	strongly above				Nelumbo `Bian Lian`	5
20 (*)	QN	MG/VG	(+)		30	
	Flower: height					
	very short				Nelumbo `Chuzi Luo`	1
	short				Nelumbo `Yanzhi Wan`	2
	medium				Nelumbo `Bo Ai`	3
	tall				Nelumbo nucifera `Zhizun Qianban`	4
	very tall				Nelumbo nucifera `Fen Bawang`	5
21 (*)	QN	MG/VG			30	
	Flower: diameter					
	very small				Nelumbo `Chuzi Luo`	1
	small				Nelumbo `Hong Sijuan`	2
	medium				Nelumbo `Yijian Lian`	3
	large				Nelumbo nucifera `Honghu Hong`	4
	very large				Nelumbo nucifera `Fen Bawang`	5

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
22	(*) PQ	MG/VG	(+)	30		
	Flower: type					
	single				Nelumbo nucifera `Honghu Hong`	1
	semi-double				Nelumbo `Cai Xia`	2
	double				Nelumbo nucifera `Dan Sajin`	3
	dual-layered				Nelumbo nucifera `Hongtai Lian`	4
	thousand-petalled				Nelumbo nucifera `Qian Ban`	5
23	(*) PQ	VG	(+)	30		
	Flower: shape					
	cup-shaped				Nelumbo `Furong Qipa`	1
	bowl-shaped				Nelumbo nucifera `Honghu Hong`	2
	plate-shaped				Nelumbo `Jin Se`	3
	Irregularly shaped				Nelumbo nucifera `Chenshan Feiyan`	4
	head-shaped				Nelumbo nucifera `Zhizun Qianban`	5
	ball-shaped				Nelumbo `Xiao Hong Dan`	6
24	(*) PQ	VG		30		
	Flower: color group					
	white				Nelumbo nucifera `Baiyangdian Bai`	1
	green				Nelumbo `Pujin Diecui`	2
	yellow				Nelumbo lutea `Yellow Bird`	3
	orange				Nelumbo `Xingse Chunshan`	4
	pink purple				Nelumbo nucifera `Hongtai Lian`	5
	red purple				Nelumbo `Weifang Mohong`	6
	purple				Nelumbo `Chenshan Zihe`	7
25	(*) QL	VG	(+)	30		
	<u>Flower: pattern of color distribution</u>					
	evenly distributed					1
	blended					2
	variegated				Nelumbo nucifera `Dan Sajin`	3

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
26	(*)	QN	VG		30	
	Flower: fading of color with age					
	absent or very weak				Nelumbo `Yijian Lian`	1
	medium				Nelumbo `Yi Xian`	2
	strong				Nelumbo `Bian Lian`	3
27	(*)	QN	MG/VG	(+)	30	
	Tepal: number					
	very few				Nelumbo `Xianxian Yuzhi`	1
	few				Nelumbo nucifera `Honghu Hong`	2
	medium				Nelumbo `Jin Se`	3
	many				Nelumbo nucifera `Zhongshan Hongtai`	4
	very many				Nelumbo `Youyi Mudan`	5
28	(*)	PQ	VG		30	
	Tepal: shape					
	obovate					1
	long-obovate					2
	obovate-lanceolate				Nelumbo `Yijian Lian`	3
	oblanceolate					4
	clawed				Nelumbo `Jiangnan Mingzhu`	5
	long-oblanceolate				Nelumbo `Tan Kong`	6
29	(*)	QN	MS/VG	(+)	30	
	Tepal: size					
	very small				Nelumbo `Chuzi Luo`	1
	small					2
	medium				Nelumbo `Yanzhi Wan`	3
	large				Nelumbo `Yijian Lian`	4
	very large				Nelumbo nucifera `Fen Bawang`, Nelumbo nucifera `Honghu Hong`	5
30	(*)	PQ	VG	(+)	30	
	Tepal: main color on the inner side					
	RHS Colour Chart (indicate reference number)					

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
31	(*) PQ	VG	(+)	30		
	Tepal: distribution of main color					
	throughout					1
	distal three quarters					2
	distal half					3
	basal half					4
	basal three quarters					5
32	(*) PQ	VG		30		
	Tepal: type of secondary color					
	absent					1
	white					2
	yellow					3
	orange					4
	green					5
	pink					6
	red					8
	purple					9
33	(*) QN	VG		30		
	Tepal: distribution of secondary color					
	at tip					1
	distal quarter					2
	distal half					3
	distal three quarters					4
	basal three quarters					5
	throughout					6
	basal half					7
	basal quarter					8
	at base					9
	at margin					10
	irregular					11

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
34	(*) PQ	VG		30		
	Tepal: shape of apex					
	acute					1
	acuminate				Nelumbo `Xianxian Yuzhi`	2
	abtusé					3
	rounded					4
	retuse				Nelumbo `Jingshui Guanyin`	5
35	QN	VG	(+)	30		
	Tepal: abaxial veins					
	absent or weak				Nelumbo nucifera `Zhongri Youyi`	1
	medium				Nelumbo nucifera `Honghu Hong`	2
	strong				Nelumbo nucifera `Taikong 36`	3
36	(*) QN	MG/VG		30		
	Stamen: number					
	absent				Nelumbo nucifera `Zhizun Qianban`	1
	very few				Nelumbo `Piaocheng Fanying`	2
	few				Nelumbo nucifera `Zhongshan Hongtai`	3
	medium				Nelumbo `Hong Sijuan`	4
	many				Nelumbo `Yijian Lian`	5
	very many				Nelumbo nucifera `Jianxuan 17`	6
37	(*) QL	VG		30		
	Anther: color					
	yellow					1
	orange					2

	English		français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
38	(*)	PQ	VG		30		
		Stamen appendage: color					
		white				Nelumbo nucifera `Baiyangdian Bai`	1
		white with purple-pink spotted apex				Nelumbo `Hong Mudan`	2
		light-yellow				Nelumbo lutea `Yellow Bird`	3
		purple-pink				Nelumbo `Yijian Lian`	4
		purple-red				Nelumbo `Gudu Jiangfang`	5
		dark-brown in upper part					6
39		PQ	VG	(+)	30		
		Stamen appendage: shape					
		obvate					1
		long obvate					2
		long ellipsoid					3
		hastiform				Nelumbo `Jiangnan Mingzhu`	4
40	(*)	QN	MS		30		
		Stamen appendage: length					
		very short					1
		short				Nelumbo nucifera `Fenhong Lingxiao`	2
		medium				Nelumbo nucifera `Honghu Hong`	3
		long				Nelumbo `Ms. Perry D. Slocum`	4
		very long				Nelumbo `Jin Fuwa`	5
41	(*)	QN	VG	(+)	20-30		
		Carpel: status of development					
		normal				Nelumbo nucifera `Honghu Hong`	1
		partially bubbled					2
		completely bubbled				Nelumbo `Qinhuai Yueye`	3
		partially petaloid				Nelumbo `Huang Linyang`	4
		completely petaloid				Nelumbo nucifera `Zhizun Qianban`	5

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
42	(*)	QN	MG		20-40	
	Carpel: number					
	absent				Nelumbo nucifera `Qian Ban`	1
	very few				Nelumbo `Hong Sijuan`	2
	few				Nelumbo `Chuzi Luo`	3
	medium				Nelumbo `Yi Xian`	4
	many				Nelumbo nucifera `Taikong 36`	5
	very many				Nelumbo nucifera `Jianxuan 17`	6
43	PQ	VG	(+)		30	
	Receptacle: color of top surface					
	yellow					1
	green-yellow					2
	yellow-green					3
	green				Nelumbo `Cuixin Xiangyang`	4
44	(*)	QN	VG	(+)	20-30	
	Receptacle: status of development					
	normal					1
	partially degenerated				Nelumbo nucifera `Hongtai Lian`	2
	absent				Nelumbo nucifera `Zhizun Qianban`	3
45	PQ	VG	(+)		30-40	
	Seedpod: shape					
	trumpet-shaped				Nelumbo `Hong Sijuan`	1
	obconical				Nelumbo nucifera `Jin Furong 2`	2
	cup-shaped				Nelumbo `Jin Fuwa`	3
	owl-shaped				Nelumbo `Perry's Giant Suburst`	4
	oblate					5
	umbrella-shaped				Nelumbo nucifera `Thai Hongyuan`	6

	English		français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
46	PQ	VG	(+)	30-40			
	Seedpod: color of top surface						
	grey-green					Nelumbo `Cuixin Xiangyang`	1
	green					Nelumbo nucifera `Honghu Hong`	2
	green-yellow						3
	purple-red					Nelumbo `Cai Xia`	4
47 (*)	PQ	VG	(+)	30-40			
	Seedpod: shape of top surface						
	concave					Nelumbo nucifera `Jin Furong 2`	1
	plate-like concave						2
	flat						3
	slightly convex						4
	convex						5
48 (*)	PQ	VG	(+)	30-40			
	Seedpod: groove depth of margine						
	absent or very shallow					Nelumbo nucifera `Jianxuan 17`	1
	shallow						2
	medium					Nelumbo `Jiuhua Haoyue`	3
	deep						4
49 (*)	QN	VG		30-40			
	Fruit: rate of fruit setting						
	absent					Nelumbo nucifera `Zhizun Qianban`	1
	very low						2
	low					Nelumbo `Moling Qiuse`	3
	medium					Nelumbo `Jiuhua Haoyue`	4
	high					Nelumbo nucifera `Jin Furong 2`	5
	very high					Nelumbo nucifera `Honghu Hong`	6

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
50 (*)	QN	MG				
			30-40			
	Fruit: position relative to top surface of seedpod					
	below					1
	same level					2
	weakly above					3
	moderately above					4
	strongly above					5
51 (*)	PQ	VG	(+)			
				30-40		
	Fruit: shape					
	narrow ellipsoid					1
	narrow obovoid				Nelumbo `Jiuhua Haoyue`	2
	narrow ovoid					3
	ellipsoid					4
	obovoid					5
	ovoid					6
	globose				Nelumbo nucifera `Honghu Hong`	7
52 (*)	PQ	VG	(+)			
				30-40		
	Fruit: anthocyanin coloration of endocarp					
	absent					1
	weak				Nelumbo nucifera `Dan Sajin`	2
	medium				Nelumbo nucifera `Honghu Hong`	3
	strong				Nelumbo `Yijian Lian`	4
53 (*)	QN	MG	(+)			
				30-40		
	Fruit: size					
	very small				Nelumbo `Chuzi Luo`	1
	small					2
	medium				Nelumbo nucifera `Honghu Hong`	3
	large				Nelumbo `Jiuhua Haoyue`	4
	very large				Nelumbo nucifera `Jianxuan 17`	5

	English		français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
54	(*)	PQ	VG	(+)	30-40		
		Fruit: color					
		brown				Nelumbo lutea `Yellow Bird`	1
		grey-brown				Nelumbo `Ms. Perry D. Slocum`	2
		gray				Nelumbo nucifera `Honghu Hong`	3
		black or dark brown				Nelumbo `Jiuhua Haoyue`	4
55	(*)	QN	VG	(+)	30-40		
		Fruit: white waxy powder					
		absent or weak				Nelumbo nucifera `Honghu Hong`	1
		medium				Nelumbo `Yanzhi Wan`	2
		strong				Nelumbo `Perry`s Giant Suburst`	3
56		QN	VG	(+)	30-40		
		Fruit: glossiness					
		absent or weak				Nelumbo nucifera `Yingquan Xike`	1
		medium				Nelumbo `Jiuhua Haoyue`	2
		strong					3
57	(*)	QN	VG	(+)	30-40		
		Fruit: longitudinal stripes					
		absent or weak				Nelumbo nucifera `Honghu Hong`	1
		medium				Nelumbo `Jiuhua Haoyue`	2
		strong					3
58	(*)	PQ	VG	(+)	30-40		
		Expanded rhizome: color					
		white				Nelumbo nucifera `Elian 1`	1
		yellow brown					2
		brown red					3

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
59 (*)	QN	VG				
			40			
	Expanded rhizome: time of maturity					
	early				Nelumbo nucifera `Elia 7`	1
	medium				Nelumbo nucifera `Elia 6`	2
	late				Nelumbo nucifera `Elia 8`	3
60 (*)	QN	MG/VG				
			40-50			
	Expanded rhizome: thickness					
	very thin				Nelumbo nucifera `Fenhong Lingxiao`	1
	thin				Nelumbo `Bian Lian`	2
	medium				Nelumbo `Hong Sijuan`	3
	thick				Nelumbo `Wu Fei`	4
	very thick				Nelumbo nucifera `Elia 1`	5
61 (*)	QN	MG/VG	(b)			
			40-50			
	Main expanded rhizome: number of internodes					
	absent or very few				Nelumbo nucifera `Fenhong Lingxiao`	1
	few					2
	medium					3
	many				Nelumbo nucifera `Elia 1`	4
62 (*)	PQ	VG				
			40-50			
	Main expanded rhizome: shape of internode					
	ovoid or ellipsoid					1
	short tubular					2
	medium tubular				Nelumbo nucifera `Elia 1`	3
	long tubular				Nelumbo nucifera `Zhongshan Hongtai`	4
	very long tubular					5

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
63 (*)	QN	VG	(+)	40-50		
	Expanded rhizome: number of branches (for rhizome lotus only)					
	few					1
	medium					2
	many					3
64 (*)	QN	MG/VG	(+)	40-50		
	Rhizome propagule: number					
	absent or very few				Nelumbo nucifera `Fenhong Lingxiao`	1
	few				Nelumbo nucifera `Zhongshan Hongtai`	2
	medium					3
	many					4
	very many					5
65 (*)	QL	VG	(+)	40-50		
	Terminal internode: shape of apex (for rhizome lotus only)					
	acute					1
	obtuse					2
66 (*)	PQ	VG		40-50		
	Rhizome shoot: color					
	white				Nelumbo nucifera `Anhui Piaohua`	1
	light-yellow					2
	purple-red					3
	light-brown				Nelumbo nucifera `Jinghua Dabai`	4
67	QL	VG		40-50		
	Expanded rhizome: texture of surface (for rhizome lotus only)					
	smooth				Nelumbo nucifera `Anhui Piaohua`	1
	rough					2

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
68 (*)	QL	VG	40-50			
	Expanded rhizome: texture of flesh (for rhizome lotus only)					
	crispy				Nelumbo nucifera `Elian 1`	1
	intermediate				Nelumbo nucifera `Elian 4`	2
	starchy				Nelumbo nucifera `Elian 5`	3

8. Explanations on the Table of Characteristics

8.1 *Explanations covering several characteristics*

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

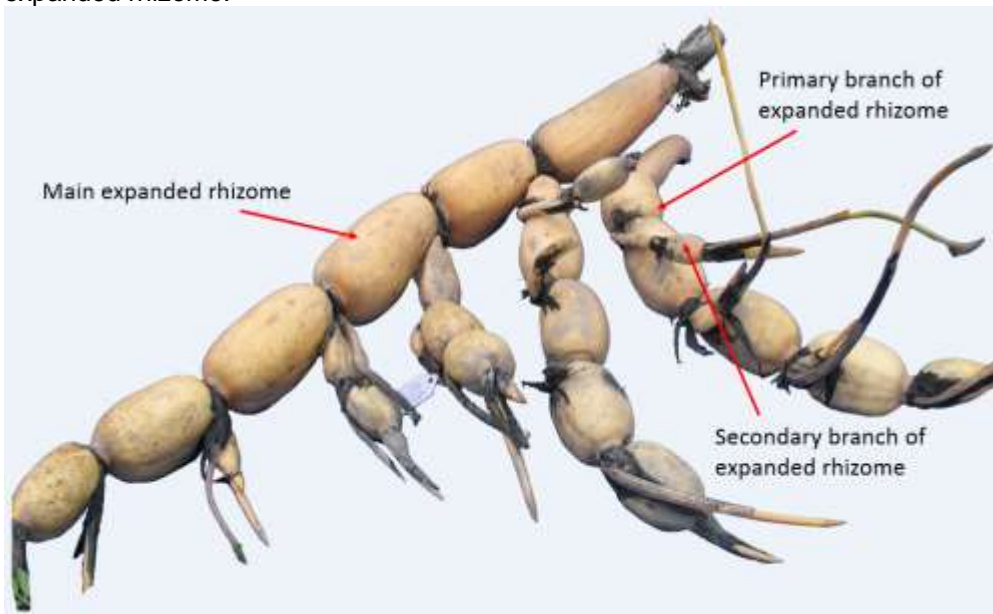
- (a) For flower, all characteristics are observed and measured on day 2 flower around 8:00–10:00 am (7:00–9:00 am in hot summer) except a few of special varieties, because a flower, particularly single and semidouble flower types, starts to open in the early morning and completely closes afternoon from day 1 to day 3. One flower usually lasts for only four days and then its tepals fall off on the 5th day or afternoon of the 4th day. For most of varieties, the second day flower has the best appearance.



bud day 1 day 2 day 3 day 4

Flowering time of a flower

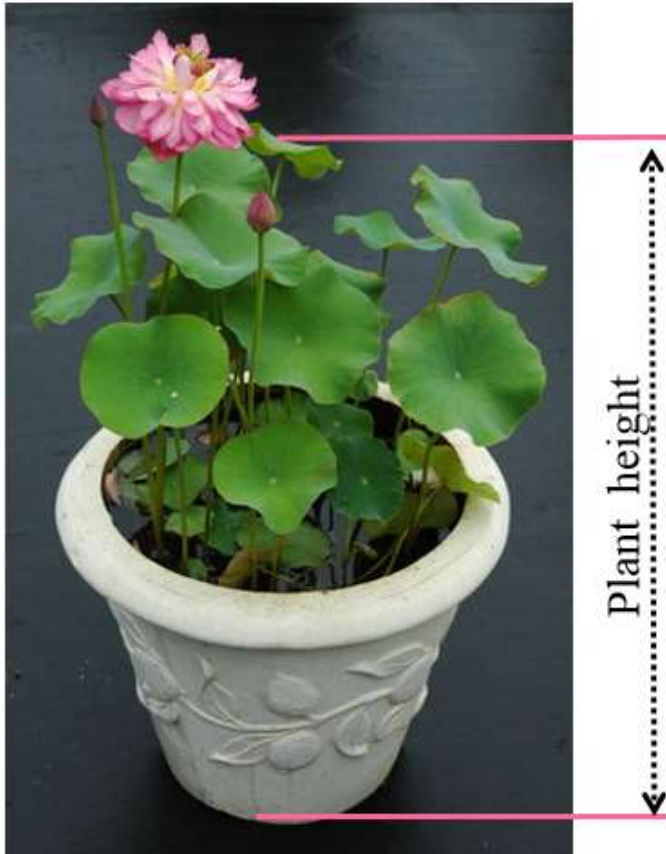
- (b) The underground expanded rhizome can be classified into three categories: Main (primary) expanded rhizome, primary branch of (secondary) expanded rhizome, secondary branch of (third) expanded rhizome.



8.2 Explanations for individual characteristics

Ad. 1: Plant: height

Plant height of lotus is defined by the height of the tallest leaf and it must be measured from the base of petiole to the top of leaf blade to meet DUS test requirement. Lotus plant usually can not reach the tallest before flowering peak, therefore plant height must be measured right after flowering peak.



Ad. 2: Emerging leaf: number

Lotus usually has both floating leaves and emerging leaves. The floating leaf has soft petiole with leaf blade floating on water surface. The emerging leaf, also called standing leaf or erect leaf, which has erect petiole with leaf blade above water (arrow indicates in figure). Only the emerging leaves will be counted based on leaf number per square meter of cultivation area. It is not counted for the varieties without emerging leaves. The later mentioned characteristics related to emerging leaves are only associated with the varieties with emerging leaf.



Ad. 4: Leaf: variegation of blade



1
absent



2
present

Ad. 5: Emerging leaf: main color of blade



1
light or medium green



2
dark green



3
yellow green

Ad. 6: Emerging leaf: shape of blade



1
rounded or nearly
rounded



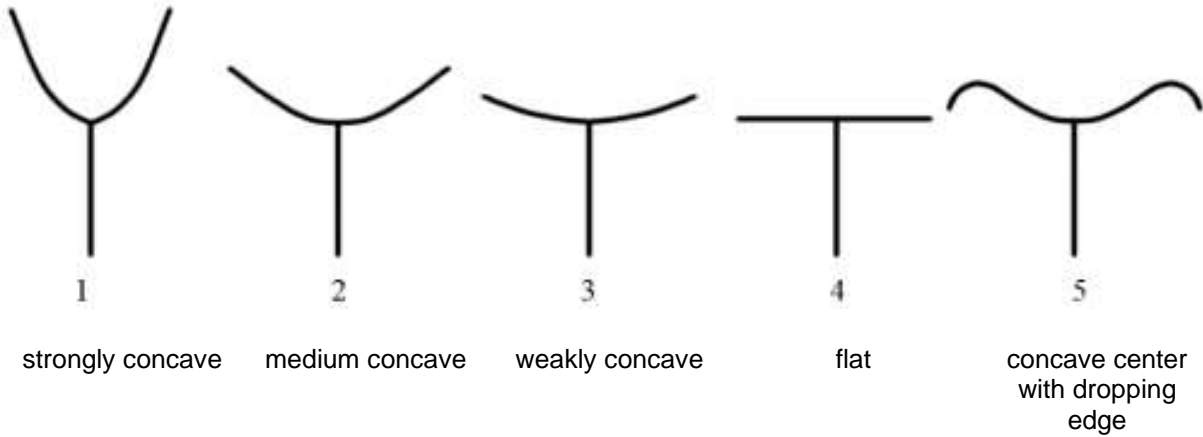
2
elliptic



3
narrow elliptic

Ad. 7: Emerging leaf: attitude of blade

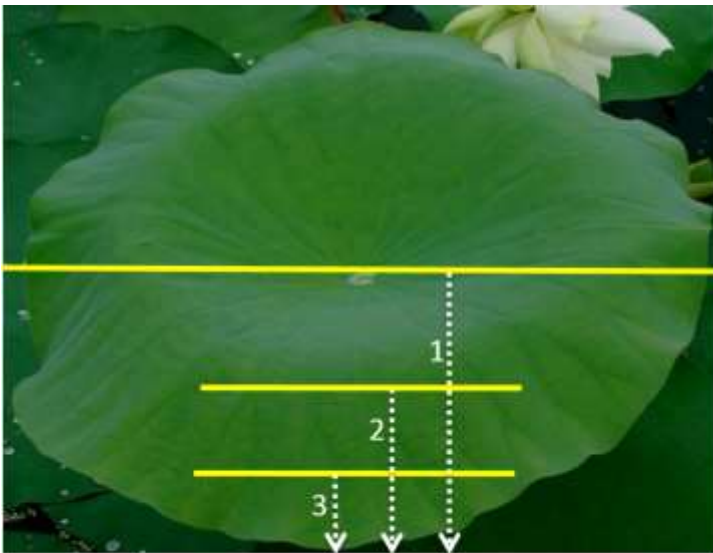
The attitude of leaf blade should be based on observation of mature emerging leaves.



Ad. 8: Emerging leaf: texture of adaxial surface

The adaxial surface texture of mature leaf can be identified by finger touch based on rough area, and degree of roughness and smoothness.

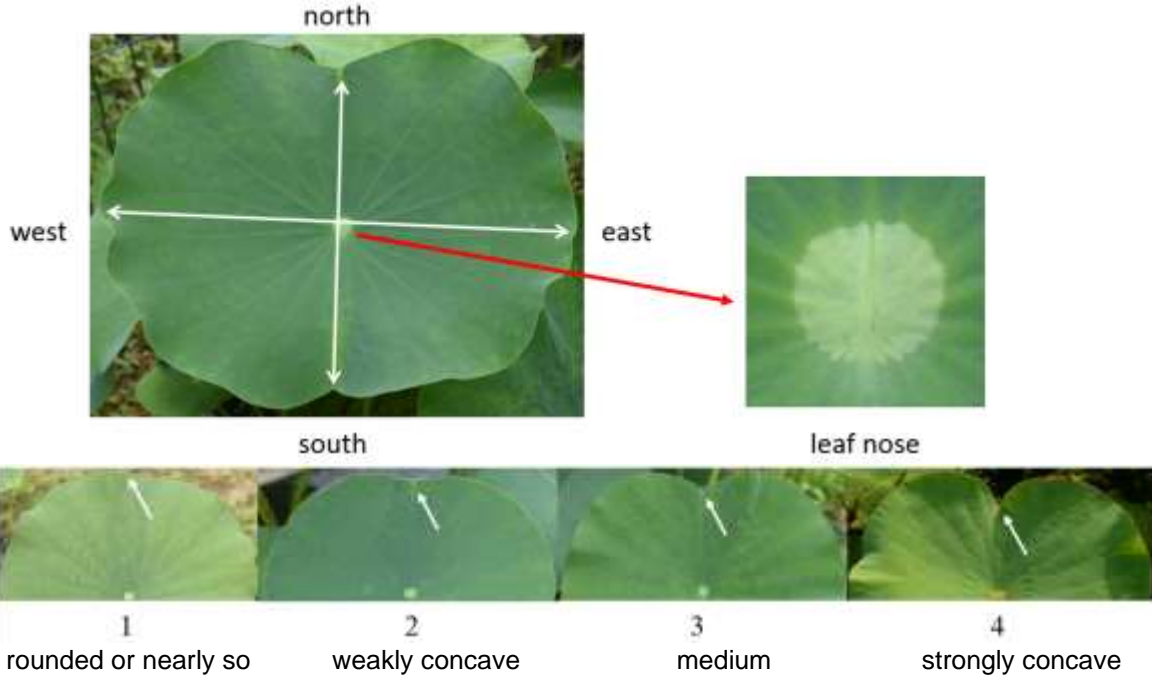
1. Very rough: fully rough
2. Medium rough: half leaf area is rough
3. Weakly rough: $\frac{1}{4}$ or less leaf area to edge is rough
4. Smooth: not rough
5. Very smooth: much smoother than 4



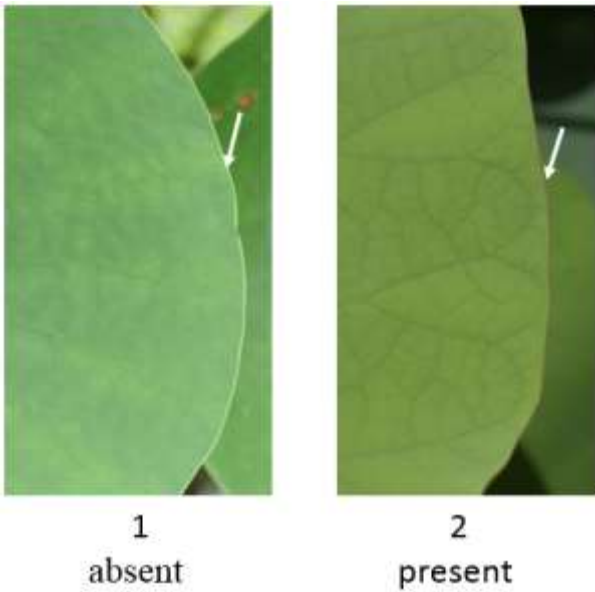
Leaf roughness based on rough area

Ad. 9: Emerging leaf: upper margin of blade

Definition on direction of leaf blade: actually the lotus leaf is bilaterally symmetric considering shape of both blade and its nose (leaf center). It is convenient for describing leaf apex by defining direction of blade side like photo showing below. For leaf edge, usually the middle position of northern side (upper side) is more concave than that of southern side (lower side). Therefore, for shape of leaf apex, only the northern side is observed for comparison.



Ad. 10: Emerging leaf: red line of margin



Ad. 11: Leaf nose: gap

Definition: leaf nose is the nose-shaped structure located at the center of leaf. The distance between two halves of nose is defined as nose gap. The wild American lotus and some hybrid of American-Asian lotus have the widest gap, Asian lotus have the narrowest gap, and most of Asian-American hybrids have intermediate gap.



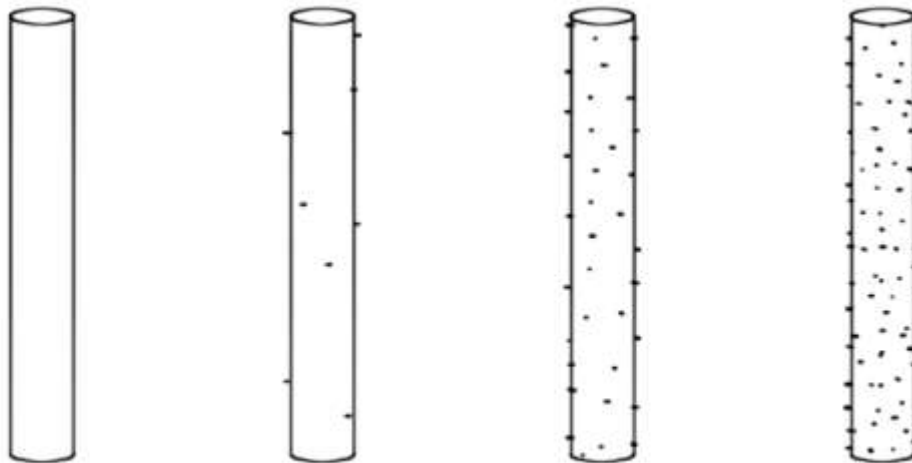
1 absent or very narrow 2 narrow 3 medium 4 broad

Ad. 12: Petiole: thickness

The diameter of petiole should be measured from the middle position of petiole for mature leaf.

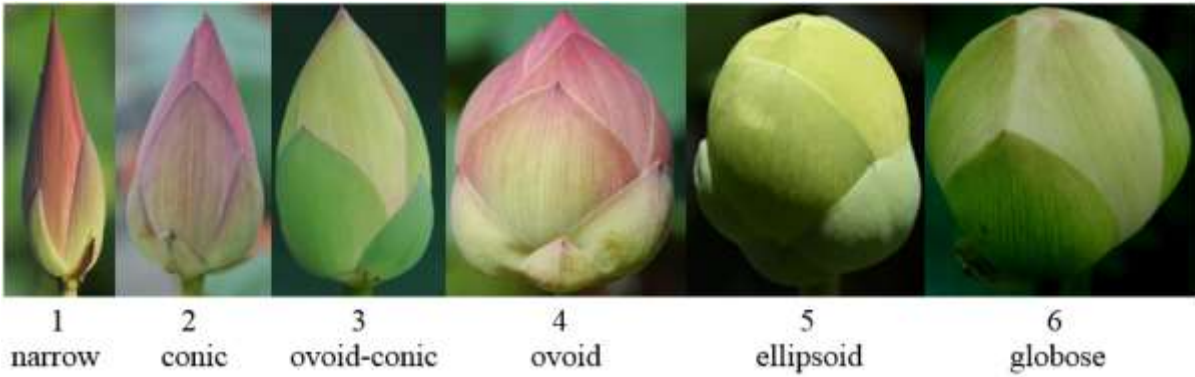
Ad. 13: Petiole: density of spines

Spine density is observed based on the middle position of petiole since it is not evenly distributed from base to top of petiole.



1 absent or very sparse 2 sparse 3 medium 4 dense

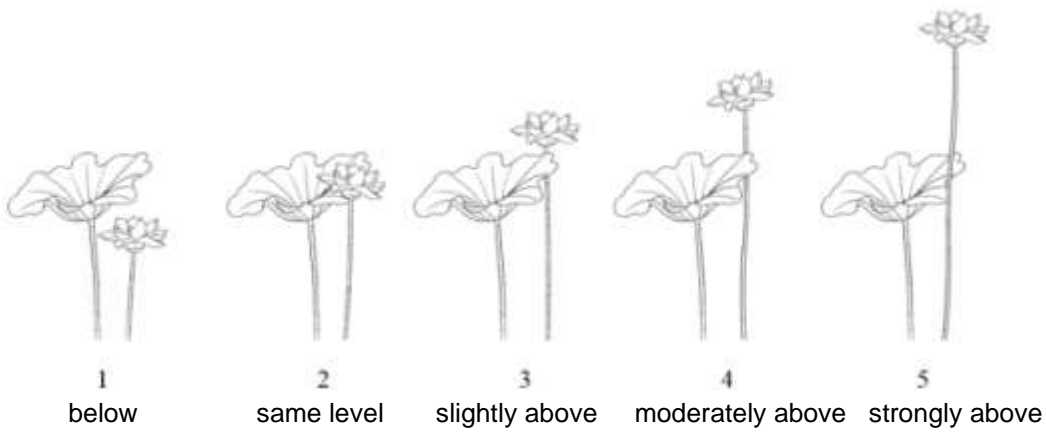
Ad. 14: Flower bud: shape



The shape of flower buds should be observed about at least two days before flower opening.

Ad. 19: Flower: position relative to leaf

The position of flower in relation to leaf is based on the relative height of a flower and its accompanying leaf for comparability. For the varieties without flowers, this data is not collected.

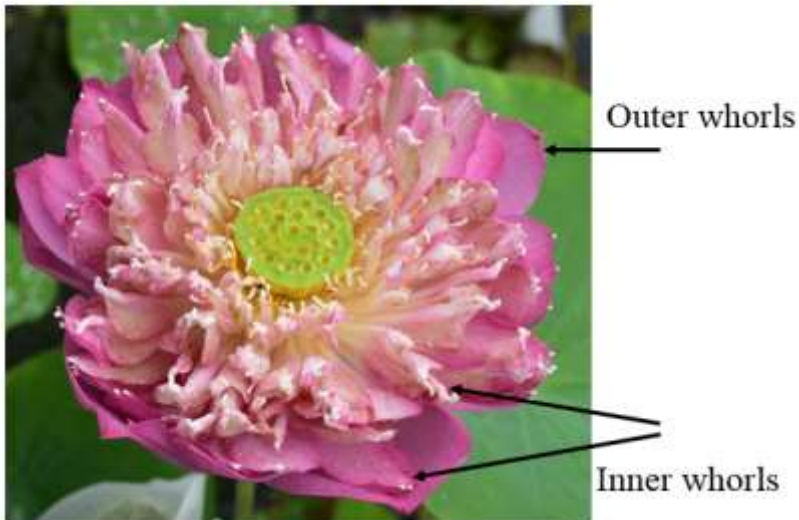


Ad. 20: Flower: height



The height of flower is defined by the length measuring from the base of flower stalk to the top of opening flower.

Ad. 22: Flower: type



For a double flower, the difference of the tepals between outer whorls and inner whorls can be easily recognized by either (a) the tepals of inner whorls downsize sharply comparing those of outer whorls, and (b) the tepals of inner whorls remain the degenerated stamen appendage on apex.

Ad. 23: Flower: shape

Definition and classification on flower shape

1. Cup-shaped: for the first day flower of most lotus cultivars, it can not fully open and looks like a cup. For a very few of cultivars, the second day flower also can not fully open.
2. Bowl-shaped: the second day flower can be usually fully open like a bowl.
3. Plate-shaped: the fully open flower looks like a plate, with nearly horizontally arranged tepals.
4. Irregularly shaped: a special flower shape of usually single flower, with irregularly arranged tepals.
5. Head-shaped: the head-shaped and fully double flower with numerous tepals, most of which come from petaloid stamens and carpels.
6. Ball-shaped: for a very few cultivars, some or most of the flower buds can not open and remain a ball shape.



Ad. 25: Flower: pattern of color distribution

The pattern of color distribution on flower is observed on the tepals of outer whorls, excluding tepal base.



1 evenly distributed 2 blended 3 variegated

Ad. 29: Tepal: size

The size of tepal is defined by calculation according to $(\text{length} + \text{width})/2$.

Ad. 30: Tepal: main color on the inner side

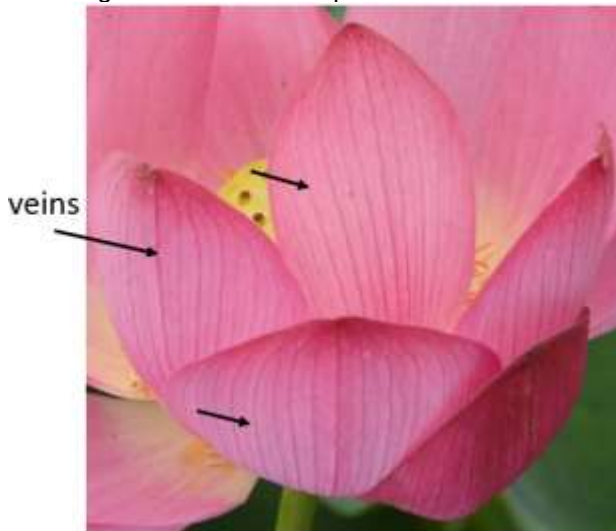
The main color is measured by RHS Color Chart during 8:00 am and 10:00 am (7:00 - 9:00 am in peak summer) based on the largest tepal of the day 2 flower.

Ad. 31: Tepal: distribution of main color

This characteristic is based on the largest (or nearly so) tepal for comparability.

Ad. 35: Tepal: abaxial veins

The longitudinal veins on tepal should be observed on abaxial surface of tepal (largest one or nearly so).



Ad. 39: Stamen appendage: shape



1
obvate

2
long obvate

3
long ellipsoid

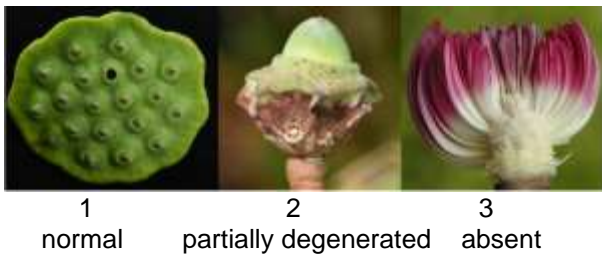
4
hastiform

Ad. 41: Carpel: status of development

1. normal: all carpels develop normally;
2. partially bubbled: part of carpels become bubbled (degerated) and could not develop into the fruits;
3. completely bubbled: all carpels become bubbled and could not develop into the fruits;
4. partially petaloid: part of carpels become petaloid;
5. completely petaloid: all carpels become petaloid.



Ad. 44: Receptacle: status of development

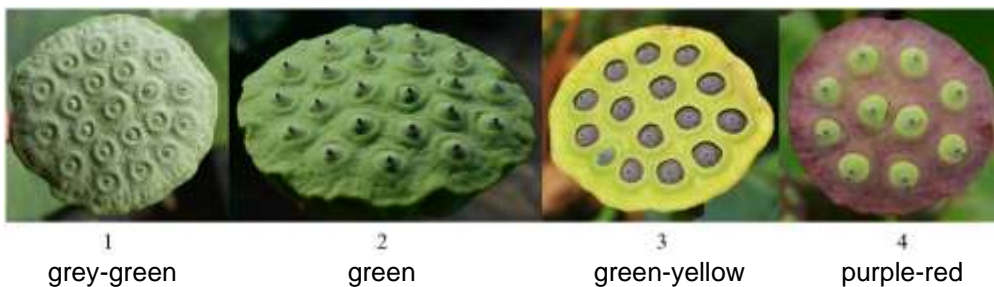


Ad. 45: Seedpod: shape

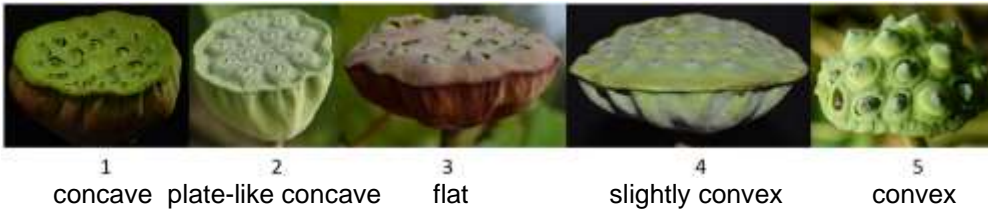


1. trumpet-shaped, 2. obconical, 3. cup-shaped, 4. bowl-shaped, 5. oblate, 6. umbrella-shaped

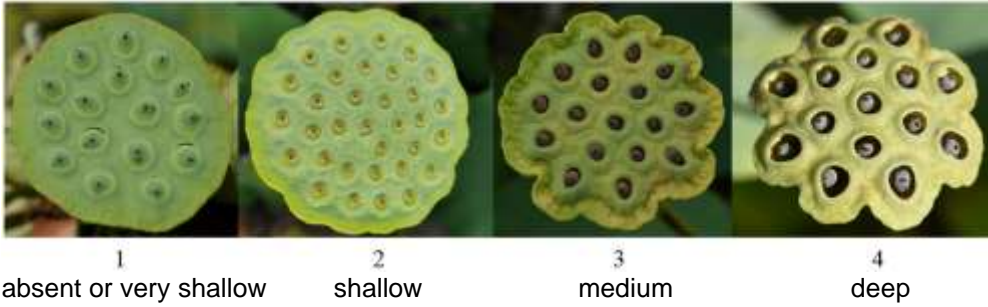
Ad. 46: Seedpod: color of top surface



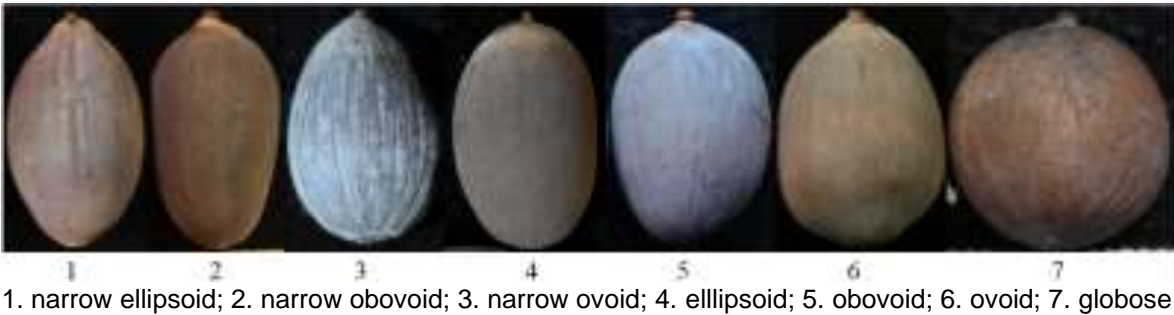
Ad. 47: Seedpod: shape of top surface



Ad. 48: Seedpod: groove depth of margin



Ad. 51: Fruit: shape



Ad. 52: Fruit: anthocyanin coloration of endocarp

For some varieties, the color may be different in two halves of endocarp, and in such case, the characteristic should be based on the half with deeper color.



Ad. 53: Fruit: size

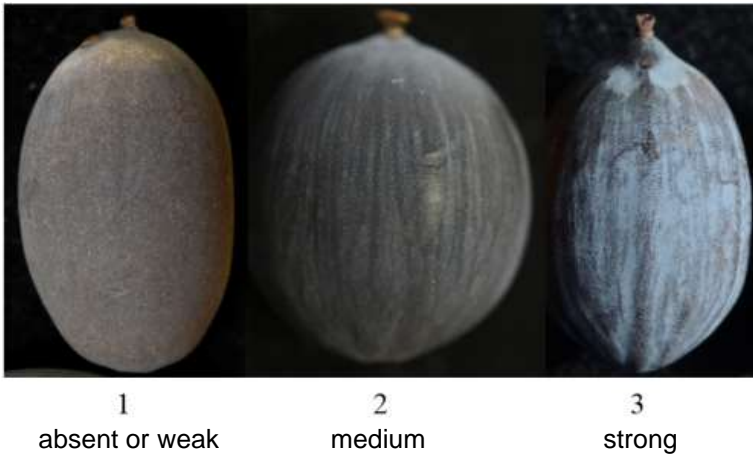
The size of dried fruit is calculated by (Length X Width)/2.

Ad. 54: Fruit: color



The color of dried fruits should be observed after the white waxy powder is removed from the surface of fruit coat.

Ad. 55: Fruit: white waxy powder



Ad. 56: Fruit: glossiness

Glossiness of the dried fruits should be observed on the mature fruits, in which the waxy powder should be wiped off by hand, cloth or napkin.

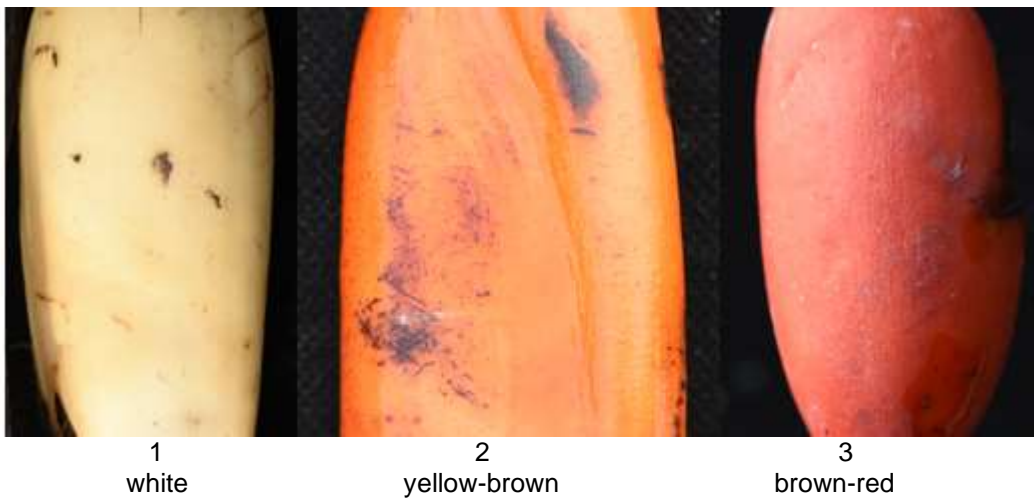


Ad. 57: Fruit: longitudinal stripes



Ad. 58: Expanded rhizome: color

Since the color of expanded rhizome may be different between early developing stage and late mature stage, it should be observed after lotus entered into dormancy in the fall.



Ad. 63: Expanded rhizome: number of branches (for rhizome lotus only)

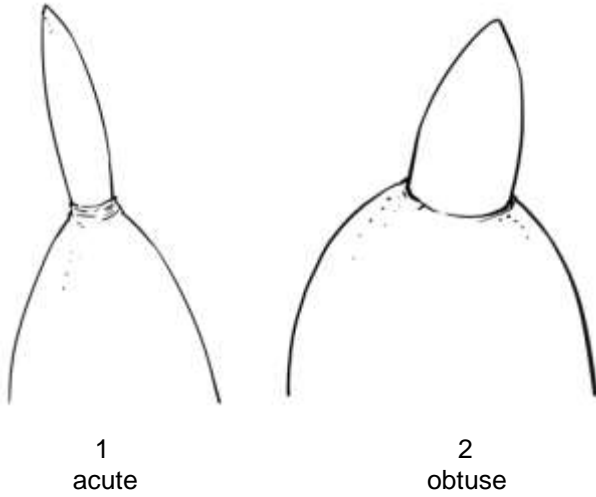
This characteristic is only applied for rhizome lotus.

Ad. 64: Rhizome propagule: number

The number of rhizome propagules is based on count of the standard rhizome propagule which consists of two internodes (usually two or one expanded) with terminal shoot at least.

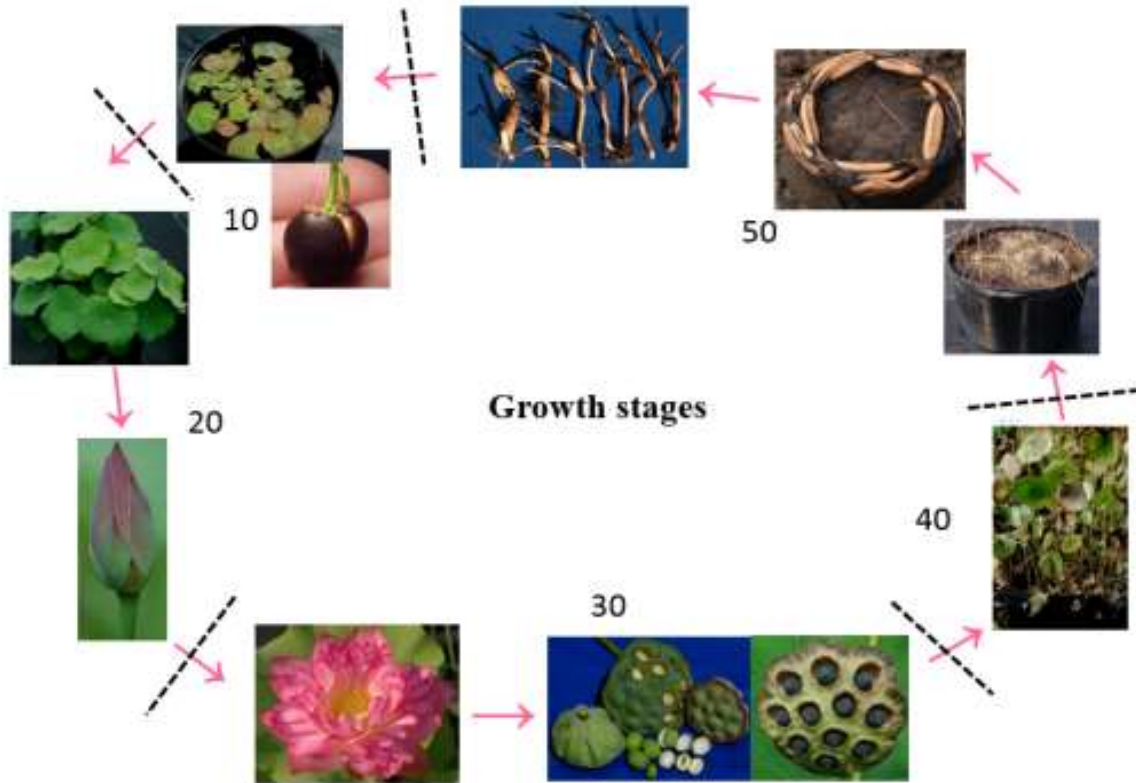


Ad. 65: Terminal internode: shape of apex (for rhizome lotus only)



8.3 Growth stages

- 10 Growth of shoots, coin leaves and floating leaves after planting in spring
- 20 Growth of emerging leaves and flower buds before flowering in early summer
- 30 Flowering, fruit setting, fruit maturation and rhizome expansion between summer and fall
- 40 Leaf aging, yellowing, and died after end of flowering in fall.
- 50 Plant dormancy in winter



9. Literature

Agricultural Department of China. 2015. Guidelines for The Conduct of Tests for Distinctness, Uniformity and Stability—Lotus (*Nelumbo Adans.*) , Standards of Agricultural Industry of China (NY/T 2756—2015) . China Agriculture Press, Beijing, China, 15pp.

Agricultural Department of China. 2016. Descriptor for Lotus Germplasm Resources. Standards of Agricultural Industry of China (NY/T 2937—2016) . . China Agriculture Press, Beijing, China, 17pp.

Ke WD, Li F, et al. 2005. Descriptors and Data Standard for Lotus (*Nelumbo nucifera* Gaertn.). China Agriculture Press, Beijing, China, 85pp.

Tian DK. 2020. Application to Register a Cultivar of Nelumbo. 8pp. <https://iwgs.org/nymphaea-and-nelumbo-registration/> (2023-2-26 accessed).

Wang QC, Zhang XY. 2005. Colored Illustration of Lotus Cultivars in China. China Forestry Press, Beijing, China, 306pp.

10. Technical Questionnaire

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:												
		Application date: (not to be filled in by the applicant)												
<p>TECHNICAL QUESTIONNAIRE to be completed in connection with an application for plant breeders' rights</p> <p>In the case of hybrid varieties which are the subject of an application for plant breeders' rights, and where the parent lines are to be submitted as a part of the examination of the hybrid variety, this Technical Questionnaire should be completed for each of the parent lines, in addition to being completed for the hybrid variety.</p>														
<p>1. Subject of the Technical Questionnaire</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%; padding: 5px;">1.1</td> <td style="width: 30%; padding: 5px;">Botanical name</td> <td style="border: 1px solid black; padding: 5px;"><i>Nelumbo</i> Adans.</td> </tr> <tr> <td style="padding: 5px;">1.2</td> <td style="padding: 5px;">Common name</td> <td style="border: 1px solid black; padding: 5px;">Lotus</td> </tr> </table>			1.1	Botanical name	<i>Nelumbo</i> Adans.	1.2	Common name	Lotus						
1.1	Botanical name	<i>Nelumbo</i> Adans.												
1.2	Common name	Lotus												
<p>2. Applicant</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 5px;">Name</td> <td style="border: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Address</td> <td style="border: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Telephone No.</td> <td style="border: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Fax No.</td> <td style="border: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">E-mail address</td> <td style="border: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Breeder (if different from applicant)</td> <td style="border: 1px solid black; height: 20px;"></td> </tr> </table>			Name		Address		Telephone No.		Fax No.		E-mail address		Breeder (if different from applicant)	
Name														
Address														
Telephone No.														
Fax No.														
E-mail address														
Breeder (if different from applicant)														
<p>3. Proposed denomination and breeder's reference</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 5px;">Proposed denomination (if available)</td> <td style="border: 1px solid black; height: 20px;"></td> </tr> <tr> <td style="padding: 5px;">Breeder's reference</td> <td style="border: 1px solid black; height: 20px;"></td> </tr> </table>			Proposed denomination (if available)		Breeder's reference									
Proposed denomination (if available)														
Breeder's reference														

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 variety)

(.....) 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)

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

4.2 Method of propagating the variety

4.2.1 Seed-propagated varieties

(a) Cross-pollination	[]
(b) Hybrid	[]
(i) Single hybrid	[]
(c) Inbred line	[]
(i) Male sterile line	[]
(ii) Male fertile line	[]
(d) Apomictic Variety	[]
(e) Other (please provide details)	[]

4.2.2 Vegetative propagation

(a) <i>In vitro</i> propagation	[]
(b) Division	[]
(c) Rhizomes	[]
(d) Other (state method)	[]

4.2.3 Other (Please provide details) []

In the case of hybrid varieties the production scheme for the hybrid should be provided on a separate sheet. This should provide details of all the parent lines required for propagating the hybrid e.g.

Single Hybrid

(.....)	x	(.....)
female parent		male parent

Three-Way Hybrid

(.....)	x	(.....)
female line		male line

(.....)	x	(.....)
single hybrid used as female parent		male parent

and should identify in particular:

- (a) any male sterile lines
- (b) maintenance system of male sterile lines.”

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 Plant: height (1)		
very short	Nelumbo `Chuzi Luo`	1 []
very short to short		2 []
short	Nelumbo `Xing Huo`	3 []
short to medium		4 []
medium	Nelumbo `Yijian Lian`	5 []
medium to tall		6 []
tall	Nelumbo lutea `Yellow Bird`	7 []
tall to very tall		8 []
very tall	Nelumbo nucifera `Fen Bawang`	9 []
5.2 Emerging leaf: number (2)		
absent	Nelumbo `Ai Xiangsi Hong`	1 []
very few	Nelumbo `Jin Fuwa`	2 []
few	Nelumbo nucifera `Zhongshan Hongtai`	3 []
medium	Nelumbo nucifera `Honghu Hong`	4 []
many	Nelumbo nucifera `Qian Ban`	5 []
very many	Nelumbo `Hong Sijuan`	6 []
5.3 Emerging leaf: attitude of blade (7)		
strongly concave		1 []
moderately concave	Nelumbo nucifera `Dan Sajin`	2 []
weakly concave		3 []
flat	Nelumbo `Jia Jingying`	4 []
concave center with dropping edge	Nelumbo nucifera `Elian 1`	5 []
5.4 Emerging leaf: texture of adaxial surface (8)		
very rough	Nelumbo nucifera `Daye Chi`	1 []
rough	Nelumbo nucifera `Honghu Hong`	2 []
medium		3 []
smooth	Nelumbo nucifera `Fenhong Lingxiao`	4 []
very smooth	Nelumbo lutea `Yellow Bird`	5 []

Characteristics	Example Varieties	Note
5.5 Emerging leaf: upper margin of blade (9)		
rounded		1 []
weakly concave	Nelumbo `Honghe Zhanchi`	2 []
moderately concave	Nelumbo `Danban Jinxia`	3 []
strongly concave		4 []
5.6 Leaf nose: gap (11)		
absent or very narrow	Nelumbo `Jia Jingying`	1 []
narrow	Nelumbo nucifera `Honghu Hong`	2 []
medium	Nelumbo `Yijian Lian`	3 []
broad		4 []
5.7 Petiole: density of spines (13)		
absent or very sparse	Nelumbo lutea `Yellow Bird`	1 []
sparse	Nelumbo `Bian Lian`	2 []
medium	Nelumbo nucifera `Honghu Hong`	3 []
dense	Nelumbo `Jia Jingying`	4 []
5.8 Flower: position relative to leaf (19)		
below		1 []
same level	Nelumbo nucifera `Zhongshan Hongtai`	2 []
slightly above	Nelumbo `Hong Sijuan`	3 []
moderately above	Nelumbo nucifera `Honghu Hong`	4 []
strongly above	Nelumbo `Bian Lian`	5 []
5.9 Flower: height (20)		
very short	Nelumbo `Chuzi Luo`	1 []
short	Nelumbo `Yanzhi Wan`	2 []
medium	Nelumbo `Bo Ai`	3 []
tall	Nelumbo nucifera `Zhizun Qianban`	4 []
very tall	Nelumbo nucifera `Fen Bawang`	5 []
5.10 Flower: type (22)		
single	Nelumbo nucifera `Honghu Hong`	1 []
semi-double	Nelumbo `Cai Xia`	2 []
double	Nelumbo nucifera `Dan Sajin`	3 []
dual-layered	Nelumbo nucifera `Hongtai Lian`	4 []
thousand-petalled	Nelumbo nucifera `Qian Ban`	5 []

Characteristics	Example Varieties	Note
5.11 Flower: shape (23)		
cup-shaped	Nelumbo `Furong Qipa`	1 []
bowl-shaped	Nelumbo nucifera `Honghu Hong`	2 []
plate-shaped	Nelumbo `Jin Se`	3 []
Irregularly shaped	Nelumbo nucifera `Chenshan Feiyan`	4 []
head-shaped	Nelumbo nucifera `Zhizun Qianban`	5 []
ball-shaped	Nelumbo `Xiao Hong Dan`	6 []
5.12 Flower: <u>pattern of color distribution</u> (25)		
evenly distributed		1 []
blended		2 []
variegated	Nelumbo nucifera `Dan Sajin`	3 []
5.13 Tepal: size (29)		
very small	Nelumbo `Chuzi Luo`	1 []
small		2 []
medium	Nelumbo `Yanzhi Wan`	3 []
large	Nelumbo `Yijian Lian`	4 []
very large	Nelumbo nucifera `Fen Bawang`, Nelumbo nucifera `Honghu Hong`	5 []
5.14 Tepal: distribution of main color (31)		
throughout		1 []
distal three quarters		2 []
distal half		3 []
basal half		4 []
basal three quarters		5 []
5.15 Tepal: abaxial veins (35)		
absent or weak	Nelumbo nucifera `Zhongri Youyi`	1 []
medium	Nelumbo nucifera `Honghu Hong`	2 []
strong	Nelumbo nucifera `Taikong 36`	3 []
5.16 Stamen appendage: shape (39)		
obvate		1 []
long obvate		2 []
long ellipsoid		3 []
hastiform	Nelumbo `Jiangnan Mingzhu`	4 []

Characteristics	Example Varieties	Note
5.17 Carpel: status of development (41)		
normal	Nelumbo nucifera `Honghu Hong`	1 []
partially bubbled		2 []
completely bubbled	Nelumbo `Qinhuai Yueye`	3 []
partially petaloid	Nelumbo `Huang Lingyang`	4 []
completely petaloid	Nelumbo nucifera `Zhizun Qianban`	5 []
5.18 Receptacle: status of development (44)		
normal		1 []
partially degenerated	Nelumbo nucifera `Hongtai Lian`	2 []
absent	Nelumbo nucifera `Zhizun Qianban`	3 []
5.19 Seedpod: shape of top surface (47)		
concave	Nelumbo nucifera `Jin Furong 2`	1 []
plate-like concave		2 []
flat		3 []
slightly convex		4 []
convex		5 []
5.20 Fruit: shape (51)		
narrow ellipsoid		1 []
narrow obovoid	Nelumbo `Jiuhua Haoyue`	2 []
narrow ovoid		3 []
ellipsoid		4 []
obovoid		5 []
ovoid		6 []
globose	Nelumbo nucifera `Honghu Hong`	7 []
5.21 Fruit: anthocyanin coloration of endocarp (52)		
absent		1 []
weak	Nelumbo nucifera `Dan Sajin`	2 []
medium	Nelumbo nucifera `Honghu Hong`	3 []
strong	Nelumbo `Yijian Lian`	4 []

Characteristics	Example Varieties	Note
5.22 Fruit: size (53)		
very small	Nelumbo `Chuzi Luo`	1 []
small		2 []
medium	Nelumbo nucifera `Honghu Hong`	3 []
large	Nelumbo `Jiuhua Haoyue`	4 []
very large	Nelumbo nucifera `Jianxuan 17`	5 []
5.23 Fruit: color (54)		
brown	Nelumbo lutea `Yellow Bird`	1 []
grey-brown	Nelumbo `Ms. Perry D. Slocum`	2 []
gray	Nelumbo nucifera `Honghu Hong`	3 []
black or dark brown	Nelumbo `Jiuhua Haoyue`	4 []
5.24 Fruit: glossiness (56)		
absent or weak	Nelumbo nucifera `Yingquan Xike`	1 []
medium	Nelumbo `Jiuhua Haoyue`	2 []
strong		3 []
5.25 Fruit: longitudinal stripes (57)		
absent or weak	Nelumbo nucifera `Honghu Hong`	1 []
medium	Nelumbo `Jiuhua Haoyue`	2 []
strong		3 []
5.26 Expanded rhizome: color (58)		
white	Nelumbo nucifera `Elian 1`	1 []
yellow brown		2 []
brown red		3 []
5.27 Expanded rhizome: number of branches (for rhizome lotus only) (63)		
few		1 []
medium		2 []
many		3 []

Characteristics	Example Varieties	Note
5.28 Rhizome propagule: number (64)		
absent or very few	Nelumbo nucifera `Fenhong Lingxiao`	1 []
few	Nelumbo nucifera `Zhongshan Hongtai`	2 []
medium		3 []
many		4 []
very many		5 []
5.29 Terminal internode: shape of apex (for rhizome lotus only) (65)		
acute		1 []
obtuse		2 []
5.30 Expanded rhizome: texture of flesh (for rhizome lotus only) (68)		
crispy	Nelumbo nucifera `Elian 1`	1 []
intermediate	Nelumbo nucifera `Elian 4`	2 []
starchy	Nelumbo nucifera `Elian 5`	3 []

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>			
<p>Comments:</p>			

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

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

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

Please provide details for where you have indicated "yes".

.....

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

Applicant's name

Signature Date

[End of document]