Type_____

No. _____

Application to Register a Cultivar of *Nelumbo*

International Waterlily and Water Gardening Society

Address for Application:

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Part I The Name of the Cultivar

Name of Cultivar_____ Nominant_____ Date _____

Address_____

Synonym_____ Native Name_____ Commercial Name_____

Discoverer_____ Address _____

or Introducer_____ Address _____

or Breeder_____ Address _____

Registrant_____ Address_____

Phone_____ Fax_____ E-mail_____

Origin and Meaning of Name_____

_____

Part II History of the Cultivar

Genus or Species of Cultivar_____

Hybrid _____ Female Parent_____ Male Parent_____

or Seedling _____ or Mutant_____ Mother Plant_____

Other Origin（tissue culture, ion injection, radiation breeding）_____ Parent_____

Description of Cultivar Breeding_____

_____

Date of Discovering, Introducing, or Breeding_____ Location_____

Year of First Bloom_____ Date of First-time Distribution or Selling_____

By What Name_____ Where_____

Date of the Earliest Publication_____ Name of Publication_____

Under Protection of Any Patent, or Brand Name or Commercial Name？ Yes_____ No_____

If Yes，Name of Patent or Brand, etc_____

Participation of Any Show？Yes_____ No_____ Name of Prize if Obtained_____

Name of Show or Competition_____

Part III Description of the Cultivar

1	Plant Size	Large Medium-large Medium Small-medium Small Micro		
2	Young Root	Color： White Pink Red		
3	Emerging Leaf	Shape：Nearly round Elliptical	Number： per pot (pot size:) Or per square meter (m^2) if in pond, etc	
5	Leaf Color	Young: Green Pink-tinted green Purple	Mature：Dark-green Green Green with pink edge	
6	Leaf Height	_ cm	Leaf Blade Size	Length (cm) _ Width (cm) _
7	Leaf Surface	Rough Slightly rough Smooth		
8	Petiole	Length (cm) _ Diameter (mm) _	With pickles: Many Few	
9	Leaf Pose	Funnel shaped Flat extended Middle concaved with dropping edge		
10	Date When The Mature Emerging Leaves Begin to Turn Yellow and Die			
11	Flower Time	Date of beginning blooming： Flowering Peak： End of Flowering：		
12	Flower Density	_ flowers per pot（pot size: ） or _ flowers/m^2（if in pond, lake, etc）		
13	Flower Height	Above leaf Slightly above leaf Nearly equal to leaf Below leaf		
14	Flower Bud	Color：Green Purple-red	Shape：Long oval conical Oval conical Ball-like	
15	Flower Color	White Yellow Pink Red (purple-red) Multicolored Chimeric		
16	Flower Form	Single Semi-double Double Duplicate-layered Thousand-petalled		
17	Flower Shape	Cup-shaped Bowl-shaped Dancing-stretched Plate-shaped Petal-piled-ball like Ball-shaped Nearly unopened		
18	Flower Size	Diameter (cm) _ (8:00-10:00 am recorded for the 2nd-day flower)		
19	Petal Number	_ (Outer petals： _ Inner petals： _ if clearly separated)		
20	Petal Shape (separated for outer and inner petals if needed)	Spoon-like Obovate Obovate-lanceolate Oblanceolate		
21	Petal Size (separated for outer an inner petals if needed)	Length (cm)： _ Width (cm) _		
22	Petal Coloration（by RHS Colour Chart, separated outer and inner petals if needed）	Base： Middle： Upper：		
23	Dorsal Veins on Petal	Clear Unclear	Color of Dorsal Vein：White Yellow Red	
24	Stamen	Number： _	Normal Partially petaloid Fully petaloid	Length (cm)： _
25	Filament	Color：Yellow Red Orange	Length (mm)： _	Diameter (mm)： _
26	Anther	Color：Yellow Red Orange	Length (mm)： _	Width (mm)： _
27	Staminal Appendage	Color：White Red Pink-dotted	Length (mm)： _	Width (mm)： _
28	Carpel	Number： _	Development：Normal Partially-vesiculated Fully-vesiculated Petaloid	
29	Seedpod Near Mature	Shape：Narrow trumpet-shaped Trumpet-shaped Turbinal Umbrella-shaped Oblate spheroid Bowl-like		
30	Top-surface of Seedpod：Slightly concave Flat Protruded	Seedpod Edge：Entire Irregularly wavy		
31	Seedpod Size (cm)	Length _ Diameter _		
32	Fruit Setting	Normal Partial Very few None		

33	Fruit Shape：Ellipsoidal Oval Globular	Fruit Position：Completely in receptacle Partially protruded	
34	Fruit Size (mm)：Length _ Width _	Fruit Surface：Bright Dark	
35	Underground Rhizome	Obviously expanded (vegetable type) Average Unexpanded（tropical type）	
36	Shape of Rhizome	Very short to beadlike Short-tubular Long-tubular Running-rhizome-like	
37	Resistance to Disease	High Average Low	
Additional Description (38 to 42) For A Seed-lotus Cultivar			
38	Node Position of First Flower：	Flower Number per Node： _	
39	Color of seedpod surface	Green Green with red edge Red Purple red	
40	Stigma Persistent for Mature Fruits	Yes No	Fruit Areola：Protruded Flat
41	Length to Width Ratio of Fruit： _	Fruit-setting Rate： _ %	Weight per 100 Fruits (g)： _
42	Vein on Fruit Surface：Clear Unclear	Color of Fresh Endocarp：White Red	
Additional Description (43 to 52) For A Vegetable-lotus Cultivar			
43	Branching of Edible Rhizome：High Average Low	Fresh Weight of Entire Rhizomes (g)： _	
44	Color of Young Running-rhizome：White Red	Internode Length of Running-rhizome (cm)： _	
45	Shape of Terminal Rhizome-shoot	Short-and-obtuse Long-and-acute	
46	Shape of Primary Rhizome Internode：Short-tubular Long-tubular Elongated Running-rhizome-like	Shape of Internode End： Sharp-shrunk Gradual-shrunk	
47	Internode of Primary Rhizome	Length (cm)： _ Diameter(cm)： _	
48	Shape of Cross-Section of Primary Rhizome	Round Oblate or elliptical Near rectangular	
49	Flesh Color of Primary Rhizome	White Yellow-white Pinkish-white	
50	Surface Color of Edible Rhizome：White Yellow-white-	Rhizome Surface：Smooth Rough	
51	Maturation of Edible Rhizome	Early Average Late	
52	Taste of Rhizome After Cooked	Starchy Intermediate Crispy	
53	Other Important Description		
54	**Major Difference from Parents**		
55	**Major Difference from a Close Cultivar**		
56	**Complete Description of the Cultivar**		

Part IV Photographs

Code	Object of Photo	Note
1*	**Whole Plant at Peak Flowering**	**The true (usually maximum) plant size of a cultivar can be shown at flowering peak time**
2	A full view of a mature leaf	To show leaf size and color
3*	**Flower Bud**	**One shot of bud (1 to a few days before flower opening) to show bud shape and color**
4	1st-day Flower	One shot from top and side to show color of upper part of petals
5*	**2nd-day Flower**	Each shot from top and side to show flower shape, color, other parts
6*	**Pistil and stamen（2nd day flower）**	**Close-up shot of flower to clearly show number and color of pistils and stamens**
7	3rd-day Flower	Each shot from the top and side of flower to show change of flower shape and color compared to day 1 - 2 flowers
8	4th-day Flower	One shot from top to show change of flower shape and color
9*	**Dissection of 2nd Day Flower**	**A group shot of well-arranged petals, stamens, pistils, and young seedpod to show their shape and color**
10*	**Mature Seedpod**	**Each shot from top and side a few days before seedpod color changes to show shape, color, situation of development and seed-setting**
11*	**Fruits (if available)**	To show size, shape and color of fruits
12	Shape of Expanded Rhizome	**Must be included for a vegetable cultivar to show rhizome shape**
13	Cross-section of Expanded Rhizome	**Must be included for a vegetable cultivar to show the color of rhizome flesh, shape, diameter, arrangement pattern of holes**
14	**Female Parent Flower（2nd day）**	To help on identification of parents and a cultivar
15	**Male Parent Flower（2nd day）**	To help on identification of parents and a cultivar

Note：

（1）Item of bold with ***** must be included.

（2）Photos for flowers particularly the 1st to 2nd day flower should be best taken at 8:00-10:00 am on a sunny day. However, the time of photographing should be slightly adjusted as needed based on the country, place, season and the local climate.

（3）Use of a SLR (Single Lens Reflex) camera is suggested to make a high quality photo which should be clear enough with a high resolution.

（4）Photographing for some special cultivars is not limited to the above-mentioned requirements. It should be a case-by-case consideration. For example, thousand-petalled type lotus do not usually open in the same way as other typical cultivars. Its inner petals keep growing as the outer petals fall off and don't open until nearly all outer petals are gone. A very small number of cultivars may don't normally open at all.

(5) Photos should be a slide filed (see **Example of Photos for Lotus Cultivar Registration**), and the individual photos should also be sent along with the registration form by a file wrapped by WinRAR or other similar software.

Important Notes for *Nelumbo* Cultivar Registration Form

See the following explanation of terminology and requirements for registration. Some of the characteristics asked for may seem technical or cumbersome. Please be as thorough as possible and email if you have questions of the requested data. It is important to be thorough to avoid confusion and assure that your new cultivar can be distinguished among others closely related.

For further instructions, contact the Registrar, Dr. Daike Tian at address above.

Definition of Lotus Type

Three types of lotus cultivars are traditionally and horticulturally classified. (1) **Vegetable Lotus** (also edible lotus)**:** a cultivar is mainly used to produce expanded underground rhizome for vegetable use or other food sources. So far, all vegetable lotuses are large sized; (2) **Flower Lotus:** a cultivar which is mainly cultivated for ornamental uses due to their beautiful flowers; (3) **Seed Lotus:** a cultivar which is cultivated for production of seeds used as food or medicine. The seed lotus may also belong to the flower lotus category.

Flower Time

For *Nelumbo*, the life of one flower typically lasts for four days. The first-day flower opens in the morning but is not fully open, then closes around noon or in the early afternoon. The flower fully opens in the morning of the second day and will close either at some degree or completely around noon. The third-day flower often does not close and the petals will possibly start to fall off after noon due to a strong wind or rain. The petals of forth-day flower have less beauty for enjoying and are vulnerable to damage of wind, rain and any other physical movement. However, the flower life may extend to five or more days in two situations, one such situation is when temperature is relatively low during blooming. The other occurs in some special cultivars like *N. nucifera* 'Zizhun Qianban' and 'Qianban Lian' (Thousand-petalled type) which don't open as other typical cultivars. The inner petals are only visible after many or all of outer petals fall off. The flower opens gradually and may last for one week even longer.

General Guide of How to Collect Data and Fill the Form

The data should be carefully and scientifically collected as much as possible, particularly the most important characteristics extremely valuable for identification and industrial use of the cultivar, as well as for database construction and scientific research in the future. Plants should be well cultivated and carefully managed to encourage good performance in growth and development. The samples of lotus plants to evaluate should be large enough to make the statistical data more meaningful. For evaluation of a lotus cultivar, six containers or 5 square meters of area when planted in pond, lake, river, ect, are suggested to be a minimum of sample size. For data record of each morphological item, both mean value and variation range are useful to represent the true morphological characteristics of the cultivar. Therefore, the influence of time (early, middle, late season of plant growth) to plant growth should be considered when collecting data. It is suggested to record data in different growth seasons (say early, middle, late season). Also, the randomized sampling method should be used along with a consideration of a minimum and maximum value range of a given characteristic.

Part I The Name of the Cultivar

Nominant is the person who invented or coined the epithet to be applied to the cultivar.

Native Name is a name (not the registered English name) in the native language of the country where a cultivar comes from or is named. For example, beside an official registered name, a cultivar may have a Chinese or Japanese name, too.

Discoverer is the person who first discovered a plant, mutant, or seedling, which the new cultivar originates from.

Introducer is the person who first introduced or distributed the plant either privately or commercially.

Registrant is the person or an institution who wants to register a cultivar.

Part II History of the Cultivar

Genus or Species of Cultivar: Although many *Nelumbo* species are named based on fossil records, only two living species are accepted, *N. lutea* from America and Caribbean Islands and *N. nucifera* from Asia and Australia. If a cultivar comes from a cross of these two species, *N. lutea* × *nucifera*, or *N. nucifera* × *lutea* should be recorded here.

Part III Description of the Cultivar

3. Number of Leaf: This is recorded by how many leaves per container (container size should be shown here) if planted in containers, or how many leaves per square meter (m^2) if in pond, rice field or lake, etc.

6. Leaf Height: To make a standard measurement, leaf height should be measured from the bottom of the container to the highest position of the leaf because the petiole usually grows from the soil near the bottom of pots, the different sized containers may be used, and water level is variable, too, or from the soil level to the top of leaf when planted in pond, river, or lake, ect, because it is difficult to check how deep the soil is.

8. Petiole Length: is almost equal to or slightly less than plant height for lotus. It should be always measured from the bottom of the pot to the highest position of petiole when planted in containers, or starting from the soil level when planted in pond, river, or lake, ect.

11. Flower Time: is the flowering period for the entire population of a lotus cultivar or all plants of the cultivar growing at a specified location. **Flowering Peak** may consist of major and minor peaks in some places.

15. Flower Color: Multicolored is defined as a flower with two or more colors on the petals, and the

boundary between any two colors is not clear with a gradual transition. **Chimeric** is a flower which has at least two types of colors with a distinct boundary between them on a petal, such as Chinese lotus cultivars *N. nucifera* 'Da Sajin' and *N. nucifera* 'Dang Sajin' which also is known as *N. nucifera* 'Alba Striata' and *N. nucifera* 'Empress'

16. Flower Form: Duplicate-layered is a flower form in which all the carpels become the petaloid structure to form two layers with other normal petals, and the two layers are separated by the stamens between them **Thousand-petalled** is a flower form in which both stamens and pistils turn into the petals (some are very tiny) and normally consists of more than one thousand and even up to three thousand petals.

17. Flower Shape: Dancing-stretched is a flower shape in which the cultivar is usually single type and its petals are extended in different direction and angles, and more space between petals, like a dancer's pose at blooming. **Petal-piled ball like** is a flower shape in which the petals are stacked one by one to form a shape nearly like a ball.

18. Flower Size: As a standard, the measurement of any flower parts should be better taken at 8:00-10:00 am to make data comparable and meaningful for regular lotus cultivars.

19. Petal Number: All tepals of a flower should be counted including the outer sepal-like tepals. Although, the most outer two tepals at least can be taken as the sepals, but the boundary is not absolutely obvious between these two and other inner tepals. A gradual transition of size and color exists. For a cultivar of double flower type, the tepals are usually divided into two layers which should be separately counted.

21. Petal Size: The measurements of the largest petals each flower is more useful data for cultivar comparison and identification since the tepals has a gradual transition on size for any cultivars of lotus.

22. Petal Coloration: As the international standard, the RHS Colour Chart published by the Royal Horticultural Society (UK) should be used for color calibration. The most updated version of chart is preferable but the older version will also be acceptable.

36. Shape of Rhizome: Running-rhizome-like is a type of rhizome which is not obviously or slightly expanded. Unlike edible lotus rhizome, the lotus cultivars native to Thailand, Sri Lank, and other south Asian tropical areas don't develop the expanded rhizome.

43. Fresh Weight of Entire Rhizomes: The entire rhizomes here are defined by the rhizomes consisting of the primary stem rhizome and any other branches of rhizomes connecting to the primary one.

45. Shape of Terminal Rhizome-shoot: The terminal rhizome-shoot is a shoot on the end of expanded rhizome, either main stem or its branches. The shoot may consist of a dormant leaf and flower bud.

52. Taste of Rhizome after Cooked: **Starchy**-type lotus rhizomes taste like eating roasted potato, sweet potato or taro, while **crispy**-type rhizomes taste like eating fresh cucumber or a crispy apple.

53. Other Important Description: Some information is not mentioned above but is also important to document and identify the cultivar, such as flower fragrance, changeable color, tolerance to very deep water, salt-resistance, water depth of pond, lake, where you collect data, etc. Any other information you have available about your new cultivar should be included.

PS: More details will be available from **A Handbook for International *Nelumbo* Cultivar Registration** which is under preparation and will be available soon.

Example of Photo Arrangement for Lotus Cultivar Registration

Nelumbo 'Ken's Dream' (Daike Tian, 2010)