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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
 GENEVA

DRAFT

ANUBIAS

UPOV Code: ANUBI (code for genus)

Anubias heterophila Engler,
Anubias barteri var. *barteri* Schott and
Anubias barteri var. *nana* Engler

GUIDELINES

FOR THE CONDUCT OF TESTS

FOR DISTINCTNESS, UNIFORMITY AND STABILITY

prepared by experts from Singapore

*to be considered by the
 Technical Working Party for Ornamental Plants and Forest Trees
 at its fortieth session, to be held in Kunming, China, from July 2 to 6, 2007*

Alternative Names:*

<i>Botanical name</i>	<i>English</i>	<i>French</i>	<i>German</i>	<i>Spanish</i>
.....	Anubias

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 *Anubias heterophila* Engler, *Anubias barteri* var. *barteri* Schott and *Anubias barteri* var. *nana* Engler of the family *Araceae*.

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 three-month-old rooted cuttings.

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

30 three-month-old rooted cuttings

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*

The minimum duration of tests should normally be a single growing cycle.

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.

Temperature:	Preferably between 25°C - 32°C
Growing Technique:	Potted plants in hydroponic system
Substrate:	Rock wool
Fertilization:	Ensure all nutrients are present at the optimal level in the re-circulating water
Shading:	50% shade should be provided in the growing area.

Air humidity: Around 85%

~~3.3.2 The optimum stage of development for the assessment of each characteristic is indicated by a number in the second column of the Table of Characteristics. The stages of development denoted by each number are described in Section 8.~~

3.3.3 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

3.3.4 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

3.4 *Test Design*

3.4.1 Each test should be designed to result in a total of at least 30 plants, which should be divided between at least 2 replicates.

3.4.2 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.

3.5 *Number of Plants / Parts of Plants to be Examined*

Unless otherwise indicated, all observations determined by measurement or counting should be made on 10 plants or parts taken from each of 10 plants.

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*

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:

4.2.1 For the assessment of uniformity of seed-propagated varieties, the recommendations in the General Introduction for **self-pollinated / cross-pollinated / hybrid varieties** should be followed as appropriate.

4.2.2 For assessment of vegetatively propagated varieties, a population standard of 1% with an acceptance probability of at least 95% should be applied. In the case of a sample size of 30 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 tested, either by growing a further generation, or by testing a new seed or plant 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) Leaf blade: tip shape (characteristic 4)
- (b) Leaf blade: base shape (characteristic 5)
- (c) Leaf blade: rippling (characteristic 7)
- (d) Leaf blade: young leaf color (characteristic 9)
- (e) Inflorescence: curvature of spathe on maturity (before pollination) (characteristic 12)

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)-{x} 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.	VG/ Heterophyla group					
(+)	MS only: Leaf blade: length					
QN	(a) short					3
	medium (~ 13cm)				<i>heterophyla</i> Lanceolata	5
	long				<i>heterophyla</i>	7
2.	VG/ Nana group only:					
(+)	MS Leaf blade: length					
	(a) short (<2.5cm)				<i>nana</i> Petite	3
	medium (2.5-7cm)				<i>nana</i> Wrinkled	5
	long (>7cm)					7
3.	VG/ Barteri group only:					
(+)	MS Leaf blade: length					
QN	(a) short (<11cm)				<i>barteri</i> Wavy	3
	medium (11-13cm)				<i>barteri</i> Oriental Green	5
	long (>13cm)					7
4.	VG/ Heterophyla group					
(+)	MS only: Petiole: length					
QN	(a) short (<3cm)					3
	medium (3-5cm)				<i>heterophyla</i> Lanceolata	5
	long (>5 - <8cm)				<i>heterophylla</i>	7
5.	VG/ Nana group only:					
(+)	MS Petiole: length					
QN	(a) short (<1.5cm)				<i>nana</i> Petite	3
	medium (1.5 – 6cm)				<i>nana</i> Golden	5
	long (>6cm)					7

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
6.	VG/ MS					
(+)	Barteri group only: Petiole: length					
QN	(a) short (8 - <12cm)				<i>barteri</i> Wavy	3
	medium (12-16cm)				<i>barteri</i> Marble	5
	long (<16 -<20cm)				<i>barteri</i> Broad Leaf	7
7.	VG/ MS					
(+)	Heterophyla group only: Leaf blade: width					
QN	(a) narrow (<2cm)					3
	medium (2-4cm)				<i>heterophyla</i> Lanceolata	5
	broad (>4 - <6cm)				<i>heterophyla</i>	7
8.	VG/ MS					
(+)	Nana group only: Leaf blade: width					
QN	(a) narrow (0.5- <1.5cm)				<i>nana</i> Petite	3
	medium (1.5-3cm)				<i>nana</i> Golden	5
	broad (3 -<4.5cm)				<i>nana</i> Round Leaf	7
9.	VG/ MS					
(+)	Barteri group only: Leaf blade: width					
QN	(a) narrow (<6.5cm)				<i>barteri</i> Wavy	3
	medium (6.5-8cm)				<i>barteri</i> Oriental Green	5
	broad (>8cm)				<i>barteri</i> Broad Leaf	7
10.	VG					
(*)	Leaf blade: tip shape					
(+)						
QL	(a) acute				<i>heterophyla</i> Lanceolata <i>nana</i> Petite <i>barteri</i> Variegated	1
	obtuse				<i>nana</i> Round Leaf <i>barteri</i> Oriental Green	2

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
11.	VG	Leaf blade: base shape				
(*)						
(+)						
QL	(a)	cordate			<i>nana</i> <i>barteri</i> Broad Leaf	1
		round			<i>nana</i> Round	2
		obtuse			<i>heterophylla</i> Lanceolata <i>nana</i> Gold <i>barteri</i> Marble	3
12.	VG	Leaf blade: Undulation of margin				
QL	(a)	absent			<i>heterophylla</i> Lanceolata <i>nana</i> Petite <i>barteri</i> Broad Leaf	1
		weakly expressed			<i>heterophylla</i> <i>nana</i> Round Leaf <i>barteri</i> Oriental Green	2
		strongly expressed			<i>barteri</i> "Wavy"	3
13.	VG	Leaf blade: rippling				
(*)						
QL	(a)	weak			<i>heterophylla</i> Lanceolata <i>nana</i> Petite	3
		medium			<i>nana</i> Variegated <i>barteri</i> Oriental	5
		strong			<i>heterophylla</i> <i>barteri</i> Wavy	7
14.	VG	Leaf blade: depression				
QL	(a)	absent			Heterophylla group, <i>barteri</i> var. <i>barteri</i> and its varieties	1
		present			<i>nana</i> Wrikled	9

	English	français	deutsch	español	Example Varieties/ Exemples/ Beispielssorten/ Variedades ejemplo	Note/ Nota
15. VS	Leaf blade: young leaf color					
PQ	(b) RHS colour chart					
	(d) (indicate reference number)					
	yellowish green				<i>nana</i> Golden	1
	green				<i>heterophyla</i> Lanceolata <i>nana</i> Petite	2
	brownish green				<i>nana</i> Round Leaf <i>barteri</i> Wavy	3
16. VG	Leaf blade: Mottling of mature leaf					
QL	(c) absent or very small				Heterophyla group	1
	(d) small				<i>nana</i> Marble <i>barteri</i> Marble	3
	medium					5
	large				<i>nana</i> Variegated	7
17. VG	Inflorescence : curvature of spathe on maturity (before pollination)					
(*)						
(+)						
QL	(a) absent or very weak				Heterophyla	1
	weak					3
	medium					5
	strong				<i>barteri</i> var. <i>barteri</i> <i>barteri</i> var. <i>nana</i>	7

8. Explanations on the Table of Characteristics

8.1 *Explanations covering several characteristics*

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

- (a) The optimum stage of development for the assessment of all characteristics is plants or plant parts of about 3-6 months old.
- (b) All observations on the young leaf should be made near the distal part of the shoots as soon as they have unfolded completely.
- (c) All observations on the mature leaf should be made on the 4th leaf from the tip or the leaf at the middle part of the horizontal rhizome.
- (d) The leaf blade color should be observed from the upper side.

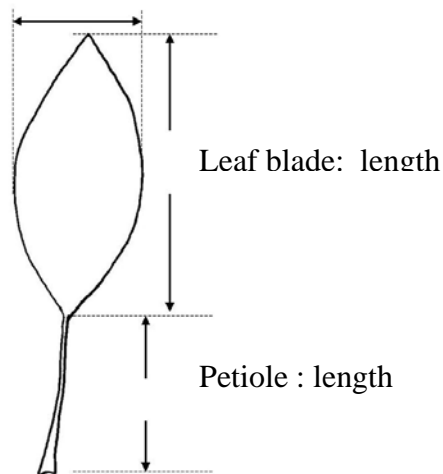
8.2 *Explanations for individual characteristics*

Ad. 1: Leaf blade: length

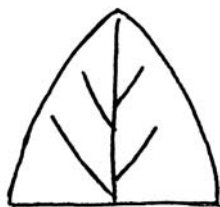
Ad. 2: Petiole: length

Ad. 3: Leaf blade: width

Leaf blade: width



Ad. 4 Leaf blade: tip shape

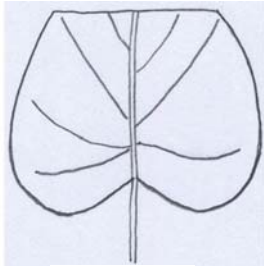


acute

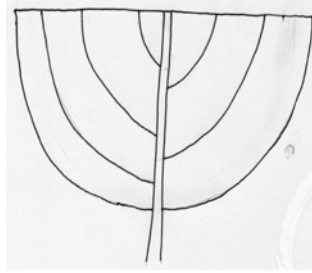


obtuse

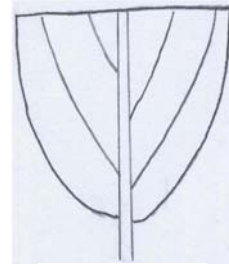
Ad. 5: Leaf blade: base shape



cordate



round



obtuse

Ad. 12: Inflorescence: spathe condition on maturity



fully open and straight



fully open and curved

9. Literature

Crusio, W.,1979: A revision of *Anubias* Schott (Araceae). Meded, Landbouwhogeschool Wageningen 79(14)

Kasselmann, C., 2003: Aquarium Plants. Krieger Publishing Company, Malabar, Florida,US, pp. 98 to110

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="Anubias"/>	
1.2 Common name	<input type="text" value="Anubias"/>	
2. Applicant		
Name	<input type="text"/>	
Address	<input type="text"/>	
Telephone No.	<input type="text"/>	
Fax No.	<input type="text"/>	
E-mail address	<input type="text"/>	
Breeder (if different from applicant)	<input type="text"/>	
3. Proposed denomination and breeder's reference		
Proposed denomination (if available)	<input type="text"/>	
Breeder's reference	<input type="text"/>	

#4. Information on the breeding scheme and propagation of the variety

4.1 Breeding scheme

Variety resulting from:

4.1.1 Crossing

- (a) controlled cross []
(please state parent varieties)
- (b) partially known cross []
(please state known parent variety(ies))
- (c) unknown cross []

4.1.2 Mutation []
(please state parent variety)

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

4.1.4 Other []
(please provide details)

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

4.2 Method of propagating the variety

4.2.1 Vegetative propagation

(a) cuttings

(b) *in vitro* propagation

(c) other (state method)

4.2.2 Seed

4.2.3 Other
(please provide details)

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics		Example Varieties	Note
5.1	Leaf blade: tip shape		
(4)			
	acute	<i>heterophylla</i> Lanceolata <i>nana</i> Petite <i>barteri</i> Variegated	1[]
	obtuse	<i>nana</i> Round Leaf <i>barteri</i> Oriental Green	2[]
5.2	Leaf blade: base shape		
(5)			
	cordate	<i>nana</i> <i>barteri</i> Broad Leaf	1[]
	round	<i>nana</i> Round	2[]
	obtuse	<i>heterophylla</i> Lanceolata <i>nana</i> Gold <i>barteri</i> Marble	3[]
5.3	Leaf blade: rippling		
(7)			
	weak	<i>heterophylla</i> Lanceolata <i>nana</i> Petite	3[]
	medium	<i>nana</i> Variegated <i>barteri</i> Oriental	5[]
	strong	<i>heterophylla</i> <i>barteri</i> Wavy	7[]
5.4	Leaf blade: young leaf color		
(9)			
	RHS colour chart (indicate reference number)		
	yellowsh green	<i>nana</i> Golden	1[]
	green	<i>heterophylla</i> Lanceolata <i>nana</i> Petite	2[]
	brownish green	<i>nana</i> Round Leaf <i>barteri</i> Wavy	3[]

TECHNICAL QUESTIONNAIRE		Page {x} of {y}	Reference Number:
Characteristics		Example Varieties	Note
5.5	Inflorescence: Curvature of spathe on maturity (before		
(12)	pollination)		
	absent or very weak	<i>heterophyla</i>	1[]
	weak		3[]
	medium		5[]
	strong	<i>barteri</i> var. <i>barteri</i> <i>barteri</i> var. <i>nana</i>	7[]

6. Similar varieties and differences from these varieties

Please use the following table and box for comments to provide information on how your candidate variety differs from the variety (or varieties) which, to the best of your knowledge, is (or are) most similar. This information may help the examination authority to conduct its examination of distinctness in a more efficient way.

Denomination(s) of variety(ies) similar to your candidate variety	Characteristic(s) in which your candidate variety differs from the similar variety(ies)	Describe the expression of the characteristic(s) for the similar variety(ies)	Describe the expression of the characteristic(s) for your candidate variety
<i>Example</i>	<i>Petiole: length</i>	<i>short</i>	<i>long</i>

Comments:

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
#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 Representative color photographs of the variety should accompany the Technical Questionnaire.

The specifications are :

- (i) The photographs should measure at least 15cm x 10cm.
- (ii) The size of the image or object in question should cover as much area of the photograph as possible.
- (iii) Printed photographs should have a non-glossy, matt finish.
- (iv) Instant photographs taken with a polaroid camera are not acceptable.
- (v) Photographs should be taken against a dark or black background, in sufficient light to prevent or minimise distortion to the natural color of the plant or part(s) of the plant.
- (vi) Printed photographs are to be submitted in a water-proof envelope or bag
- (vii) Photographs must be clearly labelled with the Applicant's name, Contact Number,
- (viii) Proposed Denomination of the new variety, and Date of Application.

The following images are required :

- (i) Close-up picture of a single inflorescence (if applicable; taken against a scale ruler)
- (ii) A picture of the whole plant (taken against a standard 30cm scale ruler)
- (iii) Any other picture(s) of the plant or part(s) of plant that will distinguish the variety from other varieties.

7.3.2 Main use of the variety

- Fully submerged aquarium / pond plant
- Partially submerged aquarium / pond plant
- Floating aquarium / pond plant
- Dry terrarium plant
- Other (please provide details) :

TECHNICAL QUESTIONNAIRE

Page {x} of {y}

Reference Number:

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]