GUIDELINES
FOR THE CONDUCT OF TESTS
FOR DISTINCTNESS, UNIFORMITY AND STABILITY

RAMBUTAN

(Nephelium lappaceum L.)

Alternative Names:

Botanical Name	Local Name	Common Name
Nephelium lappaceum L.	RAMBUTAN	RAMBUTAN

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1.0 SUBJECT OF THESE TEST GUIDELINES

These Test Guidelines apply to all ~~vegetatively propagated varieties of~~ *Nephelium lappaceum* L. [agreed by members]

2.0 MATERIAL REQUIRED

2.1. The competent authority (Plant Varieties Board) decides 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 Country other than Malaysia 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 ~~vegetatively propagated trees~~ [air layring or grafts. If the material is supplied in the form of grafts, the rootstocks of the grafts should also be supplied at the same time.]

2.3 The minimum quantity of plant material, to be supplied by the applicant, should be 5 trees. [agreed]

2.4. The plant material(s) should be visibly healthy, not lacking in vigour, 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 authority allows or requests such treatment. If it has been treated, full details of the treatment must be given.

3.0 METHOD OF INSPECTION

3.1. Number of Growing Cycles

3.1.1 The minimum duration of tests should normally be two independent fruiting cycles. [agreed]

3.1.2 The fruiting cycle is considered to be the period ranging from the beginning of active vegetative growth, flowering and fruit development and concluding with the harvesting of fruit. [agreed]

3.2 Location of Testing

Tests are normally conducted at one place. In the case of tests conducted at

more than one place, guidance is provided in UPOV document 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. In particular, it is essential that the trees produce a satisfactory crop of fruit in each of two fruiting cycles.

3.3.2 Stage of development for the assessment

The optimal stage of development for the assessment of each characteristic is indicated by a letter in the second column of the Table of Characteristics. The stages of development denoted by each letter are described at Chapter 7.0.

3.3.3 Type of observation

The recommended method of observing the characteristic is indicated by the following key in the second column of the Table of Characteristics in Chapter 8.0 of this document:

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

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

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

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

3.4. Test Design

3.4.1 Each test should be designed to result in a total of at least 5 plants.

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 fruiting period.

3.5. Number of Plantss / Parts of Plantss to be Examined

Unless otherwise indicated, all observations should be made on 5 plants or parts taken from each of 5 plants. In the case of parts of plants, the number to be

taken from each of the plants should be 5.

3.6. Additional Tests

Additional tests for specific purposes may be established.

4.0 ASSESSMENT OF DISTINCTNESS, UNIFORMITY AND STABILITY

Missing wording 4.1.4; 4.1.5

4.1. Distinctness

A plant variety is distinct if on the date of filing of an application, the variety is clearly distinguishable from any other plant variety, the existence of which is a matter of common knowledge.

4.1.1 General Recommendations

It is of particular importance for users of these Test Guidelines to consult the
UPOV document TGP 1/3: 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
inspection is not necessary. In addition, in some circumstances, the influence of the environment is not such that more than one inspection is required to provide assurance that the differences observed between varieties are sufficiently consistent.

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 UPOV document TGP 1/3: General Introduction prior to making decisions regarding distinctness.

4.2 Uniformity

A plant variety is uniform if, subject to the variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics.

4.2.1 It is of particular importance for users of these Test Guidelines to consult the UPOV document TGP 1/3: General Introduction prior to making decisions

regarding uniformity. However, the following points are provided for elaboration or emphasis in these Test Guidelines.

4.2.2 For the assessment of uniformity, a population standard 1% and an acceptance probability of at least 95% should be applied. In the case of a sample size of 5 plants, no off-types are allowed.

4.3 Stability

A plant variety is stable if its relevant characteristics remain unchanged after repeated propagation or in the case of a particular cycle of propagation, at the end of each particular cycle.

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, when a variety has been shown to be uniform, it can also be considered to be stable.

5.0 GROUPING OF VARIETIES

5.1 Candidate varieties are divided into groups to facilitate the assessment of distinctness 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 to select varieties of common knowledge. They can be compared to candidate varieties for examination of distinctness either individually or in combination with other such characteristics.

5.3 The following are useful grouping characteristics based on Table of Characteristics in Chapter 8.0:

(a) Ripe fruit: shape (in lateral view) (characteristic 11)

(b) Ripe fruit: colour of skin (excluding spinterns) (characteristic 12)

(c) Fruit: surface of pulp (characteristic 21)

5.4 Guidance for the use of grouping characteristics, in the process of examining distinctness, is provided through the UPOV document TGP 1/3: General Introduction.

6.0 INTRODUCTION TO THE TABLE OF CHARACTERISTICS

6.1 Categories of Characteristics

6.1.1 National Test Guidelines Characteristics

National Test Guidelines characteristics are those which are proposed by appointed Examiners and Invited Experts and approved by the Plant Varieties Board for examination of DUS.

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, except when the state of expression of a preceding characteristic or regional environmental conditions render this inappropriate.

6.2 States of Expression and Corresponding Notes

6.2.1 States of expression are given for each characteristic to define the characteristic and to harmonize descriptions. Each state of expression is allocated a corresponding numerical note for ease of recording of data and for the production and exchange of the description.

6.2.2 In the case qualitative and pseudo-qualitative characteristics (see Chapter 6.3),
or relevant states of expression are presented in the characteristic. However, in the case of characteristic with 5 or more states and abbreviated scale may be used to minimize the size of Table of Characteristics. For example, in the case of quantitative characteristics with 9 states, the presentation of states of expression in the test guidelines may be abbreviated as follows:

State	Note
Small	3
Medium	5
large	7

However, each should be noted that all of the following 9 states of expression exist to described varieties and should be used as appropriate:

State	Note
Very small	1
Very small to small	2
Small	3
Small to medium	4
Medium	5
Medium to large	6
Large	7

Large to very large	8
Very large	9

6.2.3. Further explanation of the presentation of states of expression and notes is provided in document TGP/7 “Development of Test Guidelines”.

6.3 Types of Expression

An explanation of the types of expression of characteristics (qualitative, quantitative and pseudo-qualitative) is provided in the UPOV document TGP 1/3: 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: see section 3.3.3
MS: see section 3.3.3
VG: see section 3.3.3
VS: see section 3.3.3

(a) – (c) See Explanations Covering Several Characteristics in Chapter 7.0.

(+) See Explanations for Individual Characteristics in Chapter 8.0.

~~7.0~~ 8.0 *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) Mature Leaf: All observations should be made on a newly matured leaf from the upper part of the shoot which is not in active growth. ~~on the mature leaf should be made on the newly matured leaf from the tip of the branch which is not at a stage of active growth.~~

(b) Leaflet: ~~Unless otherwise stated,~~ all observations on the leaflet should be made on a middle pair of leaflets ~~that is between the distal and terminal leaflets~~.

(c) Inflorescence: ~~Unless otherwise stated,~~ all observations on the inflorescence should be made at the time of full bloom [80% of blooming]. Inflorescences should be selected from terminal panicles of typical shoots from ~~the exposed regions on~~ the outer part of the tree.

(d) Fruit: Observation should be made on the fruit when ripe for eating. ~~The fruit at the [eating] stage [just before over ripe] when picking/eating ripe. The pulp is juicy and ready for eating.~~

(e) Spinterns : ~~The numerous, long, soft spines on the surface of the peel. It is also refers as hairs on the surface of the fruit.~~ All observations on the spinterns should be made on the middle section of the fruit.

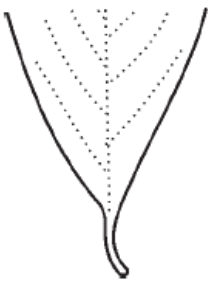
- This sentence should go with diagram for rambutan part in 8.2.
  'The numerous, long, soft spines on the surface of the peel. It is also refers as hairs on the surface of the fruit.'

~~8.0~~ 7.0 TABLE OF CHARACTERISTICS

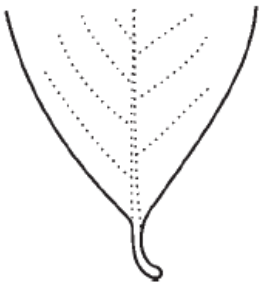
NO.		CHARACTERISTIC	STATE	EXAMPLE VARIETIES	NOTE	Remarks
1. (*) ~~(+)~~ QN	VG	Tree: ~~attitude of main branch~~ [Growth habit]	erect [upright] semi-erect [semi-upright] horizontal [spreading]	R134 R156, R191 -	1 2 3	To add explanation in 8.2
2. (*) QN	VG ~~(a)~~ ~~(b)~~	Young shoot: anthocyanin coloration	absent or very weak weak medium strong	R156, R191 R7 - R134	1 3 5 7	To add explanation in 8.2
3. (*) QN	VG (a) (b)	Leaflet : shape	elliptic obovate oblong	R191 R1 R139	1 2 3	Move after char. 6
Ad.(3): Leaflet : shape  *elliptic*  *obovate*  *oblong*						
4. QN	MS /MG /VG (a) (b)	Leaflet : length	short medium long	R191 R134 -	3 5 7	

NO.		CHARACTERISTIC	STATE	EXAMPLE VARIETIES	NOTE	Remarks
5. QN	MS /MG / VG (a) (b)	Leaflet : width	narrow medium broad	R5 R134 R1	3 5 7	
6. QN	MS (a) (b)	Leaflet : ratio length to width	low medium high		3 5 7	
7. QN	VG (a) (b)	Leaflet : undulation of leaf margin	weak medium strong	R191 R162, R185 -	3 5 7	Indonesia to provide Example variety for note 7
8. QN	VG (a) (b)	Leaflet : ~~upper surface condition~~ [Leaflet: bulging between vein]	~~Smooth~~ [absent or weak] ~~slightly raised between secondary veins~~ [medium] ~~strongly raised between secondary veins~~ [strong]	- R170, R185 R191	1 2 3	
9. (+) ~~QN~~ PQ	VG (a) (b)	Leaflet : shape of base	acute obtuse rounded	- R170,R191 -	1 2 3	Move after char. 6

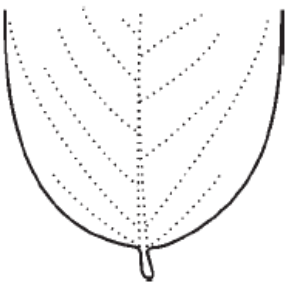
Ad.(9): Leaflet : shape of base



acute



obtuse



rounded

NO.		CHARACTERISTIC	STATE	EXAMPLE VARIETIES	NOTE	Remarks
10. QN	MS /MG /VG (c)	Inflorescence : length	short medium long	R191 R134 R156	3 5 7	
		Inflorescence: shape	pyramid conical etc… [to consider term with example varieties			**TH:** to provide picture To state the position of inflorescence to observe
11. (*) (+) PQ	VG (d)	Fruit : shape (in lateral view)	~~circular~~ [ovate] ~~ovate~~ [circular] oblong	R170, R191 R160 R162, R185	1 3 [2] 5 [3]	To add illustration in 8.2
New (*) QN	VG	Fruit: size	small medium large		3 5 7	
12. (*) PQ	VG (d)	Fruit : color of skin (excluding spinterns)	yellow orange red red	R156 R169 R190	1 2 3	

Ad.(12): Fruit : color of skin (excluding spinterns)

yellow

orange red

red

NO.		CHARACTERISTIC	STATE	EXAMPLE VARIETIES	NOTE	Remarks
13. (+) QL	VG (d)	Fruit: ~~perimeter groove~~ [suture]	absent present	R170 R191, [Var. from INA]	1 9	To add explanation MY to share picture of suture [QL/QN] To check the conspicuousness of suture by all members
14. (*) QN	~~MG/~~ VG (d) (e)	Fruit : length of spinterns	very short short medium long	R192 R7 R156 R162	1 3 5 7	INA: to provide list of EV
15. QN	VG (d) (e)	Fruit: size of the base of spinterns	small medium large	R156 R170 R185	3 [1] 5 [2] 7 [3]	
16. (*) PQ	VG (d) (e)	Fruit : colour ~~of~~ at the base of spinterns	yellow red [pinkish red] pinkish red [red]	R155, R156 R169, R191 R161,R154	1 2 3	To add illustration to explain part of spinterns
17. PQ	VG (d) (e)	Fruit : colour ~~of~~ at the middle third ~~section~~ of spinterns	~~yellow~~ greenish yellow ~~greenish yellow~~ yellow ~~red~~ pinkish red ~~pinkish red~~ red	R155 R156 R169, R191 R161, R154	1 2 3 4	To fix when to observe (at harvest)
18. QN	~~MS/~~ VG (d)	Fruit :~~skin thickness~~ thickness of skin	thin medium thick	R191 R170 R185	1 2 3	

NO.		CHARACTERISTIC	STATE	EXAMPLE VARIETIES	NOTE	Remarks
19. (*) ~~QL~~ PQ	VG (d)	Fruit : colour of the ~~under surface~~ [inner side] of skin	whitish ~~creamy~~ [yellowish white] pinkish	R160 R156, R185	1 2 3	KIV: All members to look into this char.
20. (*) ~~QL~~ PQ	VG (d)	Fruit : ~~pulp colour~~ Fruit: colour of flesh	whitish ~~creamy~~ [yellowish white]	R133, R160 R156, R191	1 2	To replace all term of 'pulp' to 'flesh'
21. (*) QN	VG (d)	Fruit: surface of ~~pulp~~ flesh	smooth ~~medium~~ [intermediate] ~~grainy~~ [rough]	R156 R170, R191 R162, R185	1 2 3	To replace all term of 'pulp' to 'flesh'
Ad.(21): Fruit: surface of ~~pulp~~ flesh [To remove]  *smooth*  *medium*  *grainy*						
22. QN	~~MS/~~ VG (d)	Fruit: ~~pulp thickness~~ thickness of flesh	thin medium thick	R155 R162, R170 R156, R191	3 5 7	To replace all term of 'pulp' to 'flesh'
23. (*) (+) QN	MG/ ~~MS/~~ VG (d)	Fruit: ~~pulp sweetness~~ sweetness	low medium high	R155 R156, R162 R134, R191	3 [1] 5 [3] 7 [5]	To add explanation Move after char. 28

NO.		CHARACTERISTIC	STATE	EXAMPLE VARIETIES	NOTE	Remarks
24. (+) QN	MG (d)	Fruit: ~~pulp sourness~~ acidity	low medium high	R191 R156, R170 R30, R168	1 2 [3] 3 [5]	To replace all term of 'pulp' to 'flesh' To add explanation (check with peach TG Add. 60) Move after char. 28
25. (*) QN	~~MG~~ VG (d)	Fruit: pulp texture texture of flesh	soft medium [firm] crunchy	R133 R170 R162, R185	1 2 3	To replace all term of 'pulp' to 'flesh' To re-look the combination of states TH: 1 firm 2 firm & crispy 3 soft ~~4 juicy~~ char. Juiciness (low, medium, high) char. Firmness
26. (*) QN	~~VS~~ VG (d)	Fruit: pulp juiciness(at over ripe stage) juiciness (at over ripe stage)	low medium high	R162, R185 R156, R191	3 [1] 5 [2] 7 [3]	To replace all term of 'pulp' to 'flesh' Move after char. 28

NO.		CHARACTERISTIC	STATE	EXAMPLE VARIETIES	NOTE	Remarks
New (*) QL	VG	Seed: adherence to flesh	absent present		1 9	
27. (*) QN	~~VS~~ VG (d)	~~Fruit: ease of separation of pulp from the seed.~~ Varieties without adherence only: Seed: degree of adherence to flesh	~~low~~ [weak] ~~medium~~ ~~high~~ [strong]	To be determined	3 [1] 5 [3] 7 [5]	To replace all term of 'pulp' to 'flesh'
28. (*) QN	~~VS~~ VG (d)	~~Fruit: adherence of testa to the pulp~~ Varieties without adherence only: Seed: adherence of testa to flesh	~~absent or very low~~ [absent or very weak] ~~low~~ [weak] medium ~~high~~ [strong]	R133, R155 R161 R170 R156, R185	1 3 5 7	To replace all term of 'pulp' to 'flesh'
29. (*) (+) PQ	VG (d)	Seed: shape	circular ovate oblong elongated [obovate] order: ovate, oblong, circular, obovate	R169 R170, R191 R185 R138	1 2 3 4	To reorder: size before shape move after char. 30

NO.		CHARACTERISTIC	STATE	EXAMPLE VARIETIES	NOTE	Remarks
Ad.(~~21~~): Seed: shape reorder  *circular*  *ovate*  *oblong*  *elongated*						
30. QN	VG (d)	Seed: size	~~absent or~~ very small small medium large	R192 R3, R189 R134, R191 R138	1 3 5 7	
1 NEW (INA) QN	VG	Leaflet: intensity of green colour on upper side	very weak weak medium strong very strong		1 3 5 7 9	All members to decide (*)
~~2~~ ~~NEW~~ ~~(TH)~~ ~~QN~~	~~VG / MG~~	~~Time of beginning of flowering~~	~~early~~ ~~medium~~ ~~late~~		~~3~~ ~~5~~ ~~7~~	~~All members to decide (*)~~

NO.		CHARACTERISTIC	STATE	EXAMPLE VARIETIES	NOTE	Remarks
3 NEW (TH) QN	VG / MG	Time of harvest maturity To add in 8.2: The stage is reached when the colour of its skin and the base of spinterns have completely changed from green to its normal ripe colour.	early medium late		3 5 7	All members to decide (*) TH: To provide EV
4 NEW (MY) QN	VG /MG	Infructescence: number of fruits	few medium many		3 5 7	After char. 10 All members to decide (*)
5 NEW (MY) QN	VG	Infructescence: density of fruits	sparse medium dense		3 5 7	After char, 10 All members to decide (*)
6 NEW (MY) QL	VG	Infructescence: synchronized ripening	absent present		1 9	All members to observe Need a (+) Illustration All members to decide (*)
7 NEW (MY) QN	VG	Fruit: fragrance	absent or very weak weak moderate strong		1 3 5 7	All members to observe All members to decide (*)

9.0 Literature

Jabatan Pertanian Semenanjung Malaysia 1999 Ciri-Ciri Pengenalan Klon Rambutan. 38p

MARDI 1986 Rambutan (Nephelium lappaceum L.) Clones and their classification, Mardi Report N0.107 33p

IPGRI. 2003 Descriptors for Rambutan (Nephelium lappaceum) International Plant Genetic Resources Institute. Rome,Italy. 65p