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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

GENEVA

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WORKING PAPER ON DRAFT TEST GUIDELINES FOR MANGO

*(Mangifera indica L.)**Document prepared by experts from South Africa*

The attached document TG/112/4(proj.1) already incorporates the standard wording of document TGP/7.2, which was adopted by the Technical Committee at its thirty-eighth session in April 2002, and includes some additional standard wording from document TGP/7.1 Draft 1, also agreed at that session.

[Document TG/112/4(proj.1) follows]



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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS
GENEVA



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

Alternative Names: *

Latin	English	French	German	Spanish
<i>Mangifera indica L</i>	Mango	Manguier	Mango	Mango

ASSOCIATED DOCUMENTS

These guidelines should be read in conjunction with document TG/1/3, "General Introduction to the Examination of Distinctness, Uniformity and Stability and the Development of Harmonized Descriptions of New Varieties of Plants" (hereinafter referred to as 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 Guidelines

These Test Guidelines apply to all varieties of *Mangifera indica* L.

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 graft sticks.

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

12 graft sticks, sufficient to propagate 5 (6) trees.

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 *Duration of Tests*

The minimum duration of tests should normally be two independent growing cycles.

3.2 *Testing Place*

The tests should normally be conducted at one place. If any characteristics of the variety, which are relevant for the examination of DUS, cannot be seen at that place, the variety may be tested at an additional place. In particular, it is essential that the trees produce a satisfactory crop of fruit in each of the two growing cycles.

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

a Young leaf: All observations on the young leaf should be made on active growth (flush).

- b** Leaf: All observations on the leaf should be on mature leaves in the middle third of the youngest shoots not showing signs of active growth. The attitude of the leaf should be observed on upward growing shoots.
- c** Inflorescence: Inflorescences should be selected from terminal panicles of typical shoots from the exposed regions of the tree.
- d** Inflorescence/flower: Unless otherwise stated, all observations on the inflorescence and the flower should be made at the time of full flowering.
- e** Mature fruit: The mature fruit is the fruit at the stage ready for harvesting. This stage is reached when the flesh is still quite firm and has not become juicy but has started coloring around the stone. All fruits for observation should be harvested from the periphery of the tree and ripened at room temperature without any artificial ripening agents.
- f** Ripe fruit: The ripe fruit is the fruit at the stage ready for consumption. This stage is reached when the flesh is juicy and has become colored from the stone to the skin.
- g** Lenticels: All observations on the lenticels should be made on the lateral side of the fruit.
- h** Length/Width/Thickness of the fruit: For observations on the length and width of the fruit, the fruit should be sawed lengthwise, through the stalk attachment and the stylar scar. For observations on the thickness, it should be sawed at right angle (perpendicular) to this. The outline may be traced and measurements made on paper. The length of the fruit is taken along the axis through the stalk attachment and the furthest point, and includes the height of the shoulder. The width is taken at the broadest part perpendicular to the length. The thickness is taken at the thickest part perpendicular to the width. For observations on the width/thickness at the base and apex of the fruit, the length is divided into eighths and observations are made at one eighth and seven eighths respectively.

3.4 *Test Design*

3.4.1 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.

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

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

Unless otherwise indicated, all observations determined by measuring or counting should be made on 5 plants or 2 parts taken from each of 5 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 minimum duration of tests recommended in section 3.1 reflects, in general, the need to ensure that any differences in a characteristic 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 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:

The acceptable number of off-types tolerated in a sample size of 5 (6) plants is none on the basis of a population standard of 1% and an acceptance probability of 95%.

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 is 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) Mature fruit: ratio length/width (characteristic 45);
- (b) Mature fruit: shape of left shoulder (characteristic 58);
- (c) Seed: polyembryony (characteristic 93);
- (d) Time of fruit maturity (characteristic 95).

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 Section 6.1.2

(QL) Qualitative characteristic – see Section 6.3

(QN) Quantitative characteristic – see Section 6.3

(PQ) Pseudo-Qualitative characteristic – see Section 6.3

(+) See Explanations on the Table of Characteristics in Chapter 8.

a to **h** Method of Examination - see Section 3.3.2

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

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
ZA: to have notes 1,2,3					
(*) 1. Tree: attitude of main branches	erect	dressé	aufrecht		3
	horizontal	horizontal	waagerecht		5
Arbre: port des rameaux principaux	drooping	retombant	hängend	Sensation	7
Baum: Haltung der Hauptzweige					
ZA: to read: ,Young leaf: presence of anthocyanin coloration‘					
(*) 2. Young leaf: anthocyanin coloration	absent	absente	fehlend		1
	present	présente	vorhanden		9
Jeune feuille: pigmentation anthocyanique					
Junges Blatt: Anthocyanfärbung					
ZA: to delete char.					
3. Young leaf: hue of anthocyanin coloration	reddish	rougeâtre	rötlich	Gouveia, Sensation, Tommy Atkins	1
	brownish	brunâtre	bräunlich	Florigon, Peach, Sabre	2
Jeune feuille: teinte de la pigmentation anthocyanique					
Junges Blatt: Ton der Anthocyanfärbung					
ZA: to delete char.					
4. Young leaf: intensity of anthocyanin coloration	weak	faible	gering	Irwin, Sensation	3
	medium	moyenne	mittel	Kent, Zill	5
	strong	forte	stark	Goveia, Peach, Sabre	7
Jeune feuille: intensité de la pigmentation anthocyanique					
Junges Blatt: Stärke der Anthocyanfärbung					
ZA: to delete char.					
5. <u>Young</u> leaf: shape in cross section	straight	droite	gerade	Carrie	1
(+)	concave	concave	konkav	Sabre	2
<u>Jeune</u> feuille: forme de la section transversale					
<u>Junges</u> Blatt: Form im Querschnitt					
ZA: to delete char.					
6. <u>Young</u> leaf: relief of upper face	sunken between secondary veins	en creux entre les nervures secondaires	ingesunken zwischen den sekundären Adern	Sabre	3
(+)	smooth	lisse	glatt		5
<u>Jeune</u> feuille: relief de la face supérieure					
<u>Junges</u> Blatt: Relief der Oberseite	raised between secondary veins	élevée entre les nervures secondaires	erhöht zwischen den sekundären Adern	Carrie	7

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
ZA: to delete char.					
7. <u>Young</u> leaf: undulation of margin	absent	absente	fehlend	Carrie, Irwin	1
	present	présente	vorhanden	Kent, Peach	9
<u>Jeune</u> feuille: ondulation du bord					
<u>Junges</u> Blatt: Wellung des Randes					

ZA: should we say ,leaf‘ instead of ,fully developed leaf‘ for chars. 8 – 27, as in apple?

The leaves mostly don't droop but rather recurve. The attitude could be influenced by curvature of the petiole and/or the blade. How should we handle this? Compare chars 17, 18 and 26. Should we combine all these into this char 8 and say: ,Leaf: general attitude semi-erect 1, perpendicular 2, slightly recurved 3, strongly recurved 4? (Notes could also be 3,5,7,9 depending on decision for TGP/7.) Don't know of mangoes with erect leaves.

(*) 8. Fully developed leaf: attitude	horizontal	horizontal	waagerecht	Sensation	1
	drooping	retombant	hängend	Irwin	2
Feuille à complet développement: port					
Vollentwickeltes Blatt: Haltung					
9. Fully developed leaf: length	short	courte	kurz	Adams	3
	medium	moyenne	mittel	Peach	5
Feuille à complet développement: longueur	long	longue	lang	Florigon, Hood	7
Vollentwickeltes Blatt: Länge					
10. Fully developed leaf: width	narrow	étroite	schmal	Peach	3
	medium	moyenne	mittel		5
Feuille à complet développement: largeur	wide	large	breit	Hood, Nimrod	7
Vollentwickeltes Blatt: Breite					

ZA: changed

(*) 11. Fully developed leaf: ratio length/width	very small	très petit	sehr klein		1
	small	petit	klein	Hood, Nimrod	3
Feuille à complet développement: rapport longueur/largeur	medium	moyen	mittel	Adams, Irwin, Sensation	5
Vollentwickeltes Blatt: Verhältnis Länge/Breite	large	grand	gross	Florigon	7
	very large	très grand	sehr gross	Peach	9

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
ZA: to delete? Or to change: ,Leaf: position of broadest part – below middle 1, in middle 2, along most of its length 3? Have to check.					
12. Fully developed leaf: (+) predominant shape	trullate to ovate	lancéolée à ovale	lanzettförmig bis eiförmig	Carrie, Van Dyke	1
Feuille à complet développement: forme prédominante	elliptic	elliptique	elliptisch		2
Vollentwickeltes Blatt: vorwiegende Form	oblong	oblongue	rechteckig	Hood	3
ZA: change states to yellow green, medium green, dark green					
13. Fully developed leaf: color	yellow green	vert jaune	gelbgrün	Carrie, Zill	1
Feuille à complet développement: couleur	green	verte	grün	Peach	2
Vollentwickeltes Blatt: Farbe	brown green	vert brun	braungrün		3
	dark green	vert foncé	dunkelgrün	Fascell, Nimrod	4
ZA: Should we have a third state to handle intermediate situations? Absent or very weak 1, weak 2, strong 3? (However, true absence does exist and could be separated out. This is a TGP/7 question.)					
14. Fully developed leaf: (+) twisting of blade	absent	absente	fehlend	Hood	1
Feuille à complet développement: torsion du limbe	present	présente	vorhanden	Florigon	9
Vollentwickeltes Blatt: Drehung der Blattspreite					
ZA: Same question as above – straight or slightly concave 1, moderately concave 2, strongly concave 3?					
15. Fully developed leaf: (+) shape in cross section	straight	droite	gerade	Hood	1
Feuille à complet développement: forme de la section transversale	concave	concave	konkav	Zill	2
Vollentwickeltes Blatt: Form im Querschnitt					
ZA: to delete					
16. Fully developed leaf: (+) symmetry	often asymmetric	souvent asymétrique	häufig asymmetrisch	Carrie	1
Feuille à complet développement: symétrie	always symmetric	toujours symétrique	immer symmetrisch	Hood	2
Vollentwickeltes Blatt: Symmetrie					

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
ZA: To delete and incorporate into char 8. (Or change to: ,Leaf: longitudinal curvature (or recurvature) of midrib absent or very weak 1, moderate 2, strong 3.)					
17. Fully developed leaf: (+) curvature of midrib	absent	absente	fehlend	Hood	1
	present	présente	vorhanden	Fascell, Haden	9
Feuille à complet développement: courbure de la nervure principale					
Vollentwickeltes Blatt: Krümmung der Mittelrippe					
ZA: to delete?					
18. Fully developed leaf: (+) position of curvature of midrib	apical	apicale	an der Spitze		1
	basal	basale	an der Basis		2
	from apex to base	du sommet à la base	von der Spitze zur Basis	Fascell	3
Feuille à complet développement: position de la courbure de la nervure principale					
Vollentwickeltes Blatt: Position der Krümmung der Mittelrippe					
ZA: There is also another state, namely ,sunken between secondary veins. Drawing of state 1 is upside down. However, we do not find it necessary to observe so many leaf chars. Rather delete and add some very uweful fruit chars.					
19. Fully developed leaf: (+) relief of upper surface	smooth	lisse	glatt	Sabre	1
	raised between secondary veins	élevée entre les nervures secondaires	erhöht zwischen den sekundären Adern	Carrie	2
Feuille à complet développement: relief de la face supérieure					
Vollentwickeltes Blatt: Relief der Oberseite					
20. Fully developed leaf: spacing of secondary veins	very close	très faible	sehr gering	Early Gold	1
	close	faible	gering	Sensation	3
	medium	moyen	mittel	Adams	5
	wide	grand	gross	Nimrod	7
	very wide	très grand	sehr gross	Hood	9
Feuille à complet développement: espacement entre les nervures secondaires					
Vollentwickeltes Blatt: Abstand zwischen den sekundären Adern					

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
ZA: to delete, depends strongly on age of leaf. Anyway should read ,relief of reticulate veins....‘					
21. Fully developed leaf: predominant relief of veins on upper surface	smooth	lisses	glatt		1
	grooved	cannelés	gefurcht	Early Gold	2
Feuille à complet développement: relief prédominant des nervures réticulées de la face supérieure					
Vollentwickeltes Blatt: überwiegendes Relief der netzartigen Adern der Oberseite					
ZA: change to ,absent or weak 1‘ moderate 2, strong 3‘					
22. Fully developed leaf: undulation of margin	weak	faible	gering	Tommy Atkins	3
	medium	moyenne	mittel		5
	strong	forte	stark	Florigon	7
Feuille à <u>complet</u> développement: ondula- tion du bord					
Vollentwickeltes Blatt: Wellung des Randes					
ZA: change to ,shape of apex‘					
23. Fully developed leaf: (+) shape of tip	attenuate	pointu	mit lang aus- gezogener Spitze	Florigon	1
	acuminate	acuminé	mit aufgesetz- ter Spitze	Gouveia, Nimrod	2
	acute	aigu	spitz	Hood	3
Feuille à complet développement: forme du sommet					
Vollentwickeltes Blatt: Form der Spitze					
24. Fully developed leaf: (+) shape of base	acute	aigüe	spitz	Florigon, Sabre	1
	obtuse	obtuse	stumpf		2
	rounded	arrondie	abgerundet	Fascell, Kent	3
Feuille à complet développement: forme de la base					
Vollentwickeltes Blatt: Form der Basis					
ZA: to delete. ,Flower fragrance‘ occurs in very few varieties and all varieties have some aroma.					
25. Fully developed leaf: fragrance	absent	absent	fehlend		1
	present	présent	vorhanden	Carrie	9
Feuille à complet développement: parfum					
Vollentwickeltes Blatt: Duft					

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
ZA: to combine under char 8?					
26. Fully developed leaf: attitude of petiole (in relation to stem)	erect	dressé	aufrecht	Sensation	1
	semi-erect	demi dressé	halb aufrecht	Peach	3
Feuille à complet développement: port du pétiole (par rapport à la tige)	perpendicular	perpendicu- laire	senkrecht	Haden, Zill	5
	recurved	retombant	zurückgebogen		7
Vollentwickeltes Blatt: Haltung des Stieles (im Verhältnis zum Stengel)	strongly recurved	très retombant	stark zurück- gebogen		9
27. Fully developed leaf: length of petiole	short	court	kurz	Adams	3
	medium	moyen	mittel		5
Feuille à complet développement: longueur du pétiole	long	long	lang	Florigon, Irwin	7
Voll entwickeltes Blatt: Länge des Stieles					
ZA: Either ,semi-erect 3, horizontal 5, semi-drooping 7' or states 1,2,3, depending on TGP/7.					
(*) 28. Inflorescence: attitude of axis	erect	dressé	aufrecht		3
	horizontal	horizontal	waagerecht	Irwin, Peach	5
Inflorescence: port de l'axe	drooping	retombant	überhängend	Florigon, Kent	7
Blütenstand: Haltung der Achse					
ZA: We do length excluding peduncle and length of peduncle in separate chars.					
(*) 29. Inflorescence: length	short	courte	kurz	Carrie, Peach	3
Inflorescence: longueur	medium	moyenne	mittel	Fascell	5
Blütenstand: Länge	long	longue	lang	Adams, Kent, Sheil	7
ZA: does one say width? Narrow, medium, broad					
30. Inflorescence: width	narrow	étroite	schmal		3
Inflorescence: largeur	medium	moyenne	mittel		5
Blütenstand: Breite	wide	large	breit		7
ZA: small, medium, large					
31. Inflorescence: ratio length/width	low	petit	klein		3
	medium	moyen	mittel		5
Inflorescence: rapport longueur/largeur	high	grand	gross		7
Blütenstand: Verhältnis Länge/Breite					

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
32. Inflorescence: number of branches	few	petit	gering		3
	medium	moyen	mittel		5
Inflorescence: nombre de rameaux	many	grand	gross		7
Blütenstand: Anzahl Zweige					
ZA: ,pale orange pink‘ to be ,light orange pink‘, ,pink‘ should be ,medium pink‘					
(*) 33. Inflorescence: color of axis and branches	whitish	blanchâtre	weisslich		1
	yellow green	vert jaune	gelbgrün		2
Inflorescence: couleur de l'axe et des rameaux	yellow	jaune	gelb		3
Blütenstand: Farbe der Achse und der Zweige	pale orange pink	rose orangé pâle	hellorange-rosa	Early Gold	4
	pink	rose	rosa	Haden, Peach	5
	dark pink	rose foncé	dunkelrosa	Zill	6
	red	rouge	rot	Hood	7
	purple	violette	purpur		8
ZA: not important char?					
34. Inflorescence: pubescence on axis and branches	absent	absente	fehlend		1
	present	présente	vorhanden	Tommy Atkins, Zill	9
Inflorescence: pilosité sur l'axe et sur les rameaux					
Blütenstand: Behaarung der Achse und der Zweige					
ZA: not important char?					
35. Inflorescence: density of pubescence on axis and branches	sparse	faible	locker		3
	medium	moyenne	mittel		5
Inflorescence: densité de la pilosité sur l'axe et sur les rameaux	dense	forte	dicht		7
Blütenstand: Dichte der Behaarung der Achse und der Zweige					
ZA: to delete. Varies from year to year.					
36. Inflorescence: leafy bracts	absent	absentes	fehlend		1
	present	présentes	vorhanden	Zill	9
Inflorescence: bractées en forme de feuilles					
Blütenstand: blatt-artige Hochblätter					

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
ZA: to delete? Difficult with size difference between male and female flowers.					
37. Flower: size	small	petite	klein	Carrie, Peach	3
Fleur: taille	medium	moyenne	mittel	Fascell, Sabre, Sensation	5
Blüte: Grösse	large	grande	gross	Florigon, Haden	7
ZA: to delete					
38. Flower: position of fertile stamen(s) in relation to style	parallel	parallèle	parallel	Kent, Peach	1
	oblique	oblique	schräg ab- stehend	Irwin	2
Fleur: position des éta- mines par rapport au style					
Blüte: Stellung des Staubblatts im Verhält- nis zum Griffel					
ZA: to delete					
39. Flower: length of fer- tile stamen(s) in rela- tion to style	shorter	plus courtes	kürzer	Florigon, Irwin	1
	equal	de même lon- gueur	gleichlang	Sensation, Sheil	2
Fleur: longueur des étamines fertiles par rapport au style	longer	plus longues	länger		3
Blüte: Länge des ferti- len Staubblatts im Ver- hältnis zum Griffel					
ZA: to delete					
40. Flower: development of staminodes	weak	faible	gering		3
	medium	moyen	mittel		5
Fleur: développement des staminodes	strong	fort	stark		7
Blüte: Entwicklung der Staminodien					
ZA: to combine 41 and 42 under one char and place after char 33. Wording: ,Inflorescence: predominant color of flowers‘ with states ,whitish, light orange pink, medium pink, dark pink‘ States to be checked. It is too much effort to visit the orchards again to specially observe the color of the old flowers.					
(*) 41. Old flower: antho- cyanin coloration	absent	absente	fehlend		1
	present	présente	vorhanden	Hood	9
Fleur agée: pigmentation anthocyanique					
Alte Blüte: Anthocyan- färbung					
ZA: see comments under 41.					
(*) 42. Old flower: intensity of anthocyanin colora- tion	weak	faible	gering	Carrie, Early Gold, Haden	3
	medium	moyenne	mittel	Irwin, Zill	5
Fleur agée: intensité de la pigmentation anthocyanique	strong	forte	stark	Hood, Peach	7
Alte Blüte: Stärke der Anthocyanfärbung					

	Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
(*) (+)	43. Mature fruit: length	very short	très court	sehr kurz		1
	Fruit prêt à cueillir: longueur	short	court	kurz	Adams	3
	Erntereife Frucht: Länge	medium	moyen	mittel	Irwin	5
		long	long	lang	Sabre, Tommy Atkins	7
		very long	très long	sehr lang	Anderson	9
(*) (+)	44. Mature fruit: width	very narrow	très étroit	sehr schmal		1
	Fruit prêt à cueillir: largeur	narrow	étroit	schmal	Adams	3
	Erntereife Frucht: Breite	medium	moyen	mittel	Irwin, Zill	5
		broad	large	breit	Keitt, Nimrod	7
		very broad	très large	sehr breit	Extrema	9
ZA: changed						
(*) (+)	45. Mature fruit: ratio length/width	very small	très petit	sehr klein	Extrema, Santa Alexandrina	1
	Fruit prêt à cueillir: rapport longueur/ largeur	small	petit	klein	Fascell, Sheil	3
	Erntereife Frucht: Ver- hältnis Länge/Breite	medium	moyen	mittel	Sensation, Tommy Atkins	5
		large	grand	gross	Carrie, Gouveia	7
		very large	très grand	sehr gross	Anderson, Sabre	9
ZA: change to ,thickness‘ – ,thin, medium, thick‘						
(*) (+)	46. Mature fruit: shape in cross section	narrow elliptic	elliptique étroite	schmal elliptisch	Gouveia	3
	Fruit prêt à cueillir: forme de la section transversale	broad elliptic	elliptique large	breit elliptisch	Sabre, Tommy Atkins	5
	Erntereife Frucht: Form im Querschnitt	circular	arrondie	abgerundet	Extrema, Santa Alexandrina	7

Add more characteristics:

New char. 46a: “Mature fruit: ratio width/thickness: small (1) large (9)”

New char. 46b: “Mature fruit: width at base: narrow (3), medium (5), broad (7)”. To measure the width at 1/8th of the fruit length from the basal point.

New char. 46c: “Mature fruit: ratio width/width at base: small (3), medium (5), large (7)”.

New char. 46d: “Mature fruit: width at apex”. Measure at 1/8th of fruit length from apical point. Longitudinal axis goes from the stalk attachment to the furthest point.

New char. 46e: “Mature fruit: ratio width/width at apex. States as 46c

New char. 46f: “Mature fruit: thickness at base” – thin, medium, thick. Also at 1/8th of length from basal point

New char. 46g: “Mature fruit: ratio thickness/thickness at base”. States as 46c

New char. 46h: “Mature fruit: thickness at apex”. Also at 1/8th of length from apex

New char. 46i: “Mature fruit: ratio thickness/thickness at apex”. States as 46c

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
ZA: to change order of states: ,only green, green and orange, green and pink, green and red, green and purple‘ and add as state 6 ,only purple‘.					
(*) 47. Mature fruit: color of skin	only green	seulement verte	nur grün	Carrie	1
Fruit prêt à cueillir: couleur de l'épiderme	green and purple	verte et violette	grün und purpur	Sensation, Zill	2
Erntereife Frucht: Farbe der Schale	green and red	verte et rouge	grün und rot	Fascell	3
	green and orange	verte et orange	grün und orange	Gouveia	4
	green and pink	verte et rose	grün und rosa	Kensington	5
48. Mature fruit: size of area of non-green color of skin	small	petite	klein	Zill	3
	medium	moyenne	mittel	Irwin	5
Fruit prêt à cueillir: taille de la zone de la couleur non-verte de l'épiderme	large	grande	gross	Hood, Sensation	7
Erntereife Frucht: Grösse der Zone der nicht grünen Farbe der Schale					
ZA: to change to ,conspicuousness of bloom - weak, medium, strong‘					
49. Mature fruit: bloom on skin	inconspicuous	peu nette	undeutlich	Early Gold	1
Fruit prêt à cueillir: pruine de l'épiderme	conspicuous	nette	deutlich	Sensation	2
Erntereife Frucht: Bereifung der Schale					
50. Mature fruit: density of lenticels	sparse	faible	locker	Carrie, Fascell, Kensington	3
Fruit prêt à cueillir: densité des lenticelles	medium	moyenne	mittel	Sabre	5
Erntereife Frucht: Dichte der Lentizellen	dense	forte	dicht	Hood, Sensation	7
51. Mature fruit: conspicuousness of lenticels	weak	faible	gering	Kensington, Peach, Sandersha	3
Fruit prêt à cueillir: netteté des lenticelles	medium	moyenne	mittel	Sheil	5
Erntereife Frucht: Ausprägung der Lentizellen	strong	forte	stark	Haden, Ruby	7

Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
52. Mature Fruit: size of lenticels	small	petites	klein	Sandersha, Sensation	3
Fruit prêt à cueillir: taille des lenticelles	medium	moyennes	mittel		5
Erntereife Frucht: Grösse der Lentizellen	large	grandes	gross	Haden, Sheil	7
ZA: ,absent or very weak 1, weak 2, strong 3‘					
53. Mature fruit: roughness of surface caused by lenticels	absent	absente	fehlend	Hood, Peach, Zill	1
	present	présente	vorhanden	Haden, Kensington	9
Fruit prêt à cueillir: rugosité de la surface causé par des lenticelles					
Erntereife Frucht: durch Lentizellen bedingte Rauheit der Oberfläche					
ZA: change to ,presence of stalk cavity‘					
54. Mature fruit: stalk cavity	absent	absente	fehlend	Adams, Ruby	1
	present	présente	vorhanden	Nimrod	9
Fruit prêt à cueillir: cavité pédonculaire					
Erntereife Frucht: Stielhöhle					
55. Mature fruit: depth of stalk cavity (+)	shallow	peu profonde	flach	Florigon, Haden, Irwin	3
Fruit prêt à cueillir: profondeur de la cavité pédonculaire	medium	moyenne	mittel		5
	deep	profonde	tief	Nimrod	7
Erntereife Frucht: Tiefe der Stielhöhle					
ZA: change to ,presence of neck‘					
56. Mature fruit: neck	absent	absent	fehlend	Fascell, Zill	1
Fruit prêt à cueillir: collet	present	présent	vorhanden	Ruby	9
Erntereife Frucht: Hals					
ZA: change to ,length of neck – short, medium, long‘					
57. Mature fruit: prominence of neck (+)	weak	faible	gering	Peach, Sandersha	3
	medium	moyenne	mittel		5
Fruit prêt à cueillir: netteté du collet	strong	forte	stark	Ruby	7
Erntereife Frucht: Ausprägung des Halses					

	Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
(*) (+)	58. Mature fruit: shape of <u>left</u> shoulder Fruit prêt à cueillir: forme de l'épaule <u>gauche</u> Erntereife Frucht: Form der <u>linken</u> Schulter	rounded upward	arrondie, vers le haut	abgerundet, nach oben	Tommy Atkins	1
		rounded outward	arrondie, horizontale	abgerundet, abstehend	Florigon, Palmer, Zill	3
		rounded downward	arrondie, vers le bas	abgerundet, nach unten	Keitt, Ruby, Sandersha	5
		sloping downward	inclinée, vers le bas	nach unten geneigt		7
	falling abruptly	rupture brusque	abrupt abfallend		9	
(*) (+)	59. Mature fruit: shape of <u>right</u> shoulder Fruit prêt à cueillir: forme de l'épaule <u>droite</u> Erntereife Frucht: Form der <u>rechten</u> Schulter	rounded upward	arrondie, vers le haut	abgerundet, nach oben		1
		rounded outward	arrondie, horizontale	abgerundet, abstehend	Fascell	3
		rounded downward	arrondie, vers le bas	abgerundet, nach unten	Ruby, Zill	5
		sloping downward	inclinée, vers le bas	nach unten geneigt	Keitt	7
	falling abruptly	rupture brusque	abrupt abfallend	Palmer, Sandersha	9	
60. (+)	Mature fruit: groove in left shoulder Fruit prêt à cueillir: sillon dans l'épaule gauche Erntereife Frucht: Furche in der linken Schulter	absent	absent	fehlend	Ruby	1
		present	présent	vorhanden	Kensington	9
61.	Mature fruit: length of groove in left shoulder Fruit prêt à cueillir: longueur du sillon dans l'épaule gauche Erntereife Frucht: Länge der Furche in der linken Schulter	short	court	kurz	Fascell, Sheil	3
		medium	moyenne	mittel	Kensington	5
		long	long	lang		7

	Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
62.	Mature fruit: depth of groove in left shoulder	shallow	peu profond	flach	Fascell	3
		medium	moyen	mittel	Sheil	5
	Fruit prêt à cueillir: profondeur du sillon dans l'épaule gauche	deep	profond	tief		7
	Erntereife Frucht: Tiefe der Furche in der linken Schulter					
ZA: could add a char: ,prominence of lumpiness on left shoulder – weak, medium, strong‘						
63. (+)	Mature fruit: lumpiness on left shoulder	absent	absente	fehlend	Peach, Ruby	1
		present	présente	vorhanden	Fascell, Zill	9
	Fruit prêt à cueillir: excroissance sur l'épaule gauche					
	Erntereife Frucht: Auswuchs auf der linken Schulter					
(*) (+)	64. Mature fruit: sinus proximal of stylar scar	absent	absent	fehlend	Fascell, Hood, Kent	1
		present	présent	vorhanden	Gouveia, Sabre, Sandersha	9
	Fruit prêt à cueillir: sinus proximal de la cicatrice stylaire					
	Erntereife Frucht: Sinus proximal von der Griffelnarbe					
ZA: change to ,depth‘ with states shallow, medium, deep‘						
(*) (+)	65. Mature fruit: prominence of sinus proximal of stylar scar	weak	faible	gering	Florigon, Peach	3
		medium	moyenne	mittel	Kensington	5
	Fruit prêt à cueillir: netteté du sinus proximal de la cicatrice stylaire	strong	forte	stark	Anderson, Sabre	7
	Erntereife Frucht: Ausprägung des Sinus proximal von der Griffelnarbe					
(*) (+)	66. Mature fruit: bulge proximal of stylar scar	absent	absente	fehlend	Adams, Anderson	1
		present	présente	vorhanden	Sheil	9
	Fruit prêt à cueillir: excroissance proximale de la cicatrice stylaire					
	Erntereife Frucht: Auswuchs proximal von der Griffelnarbe					

	Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
67.	Mature fruit: prominence of bulge proximal of stylar scar	weak	faible	gering	Fascell	3
		medium	moyenne	mittel		5
	Fruit prêt à cueillir: netteté de l'excroissance proximale de la cicatrice stylaire	strong	forte	stark	Nimrod, Sheil	7
	Erntereife Frucht: Ausprägung des Auswuchses proximal von der Griffelnarbe					

ZA: could add a char: ,size of point at stylar scar – small, medium, large‘

68.	Mature fruit: shape at stylar scar	depressed	deprimée	ingesenkt	Sheil	1
		flattened	aplatie	abgeflacht	Kent	2
	Fruit prêt à cueillir: forme de la cicatrice stylaire	pointed	pointue	spitz	Sandersha, Van Dyke	3
		ridged	sillonée	gefurcht	Zill	4
	Erntereife Frucht: Form an der Griffelnarbe					

ZA: change to ,diameter of stalk attachment‘. Easier to observe.

69.	Mature fruit: diameter of stalk	small	petit	klein	Sensation	3
		medium	moyen	mittel	Adams	5
	Fruit prêt à cueillir: diamètre du pédoncule	large	grand	gross	Tommy Atkins	7
	Erntereife Frucht: Durchmesser des Stieles					

ZA: to delete. Correlated with 33.

70.	Infructescence: predominant color of main axis (at mature fruit stage)	green to yellow	vert à jaune	grün bis gelb	Early Gold	1
		reddish	rougeâtre	rötlich	Hood	2
	Fructification: couleur prédominante de l'axe principale (au stade fruit prêt à cueillir)					
	Fruchtstand: überwiegende Farbe der Hauptachse (im Stadium der erntereifen Früchte)					

	Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
(*) 71.	Ripe fruit: predominant color of skin	green	verte	grün	Long Green	1
		yellow green	vert jaune	gelbgrün	Carrie, Sandersha	2
	Fruit mûr: couleur prédominante de l'épiderme	green and yellow	verte et jaune	grün und gelb	Early Gold	3
		yellow	jaune	gelb		4
	Essreife Frucht: überwiegende Farbe der Schale	yellow and orange	jaune et orange	gelb und orange	Peach	5
		orange	orange	orange		6
		yellow and red	jaune et rouge	gelb und rot	Adams, Ruby, Sensation	7
		orange and red	orange et rouge	orange und rot		8
		red	rouge	rot	Van Dyke	9
		orange and purple	orange et violette	orange und purpur	Tommy Atkins	10
		red and purple	rouge et violette	rot und purpur		11
		purple	violette	purpur		12
ZA: to delete. Don't know what it means.						
72.	Ripe fruit: brilliance of skin color	absent	absente	fehlend	Gouveia, Hood, Sheil	1
	Fruit mûr: brilliance de la couleur de l'épiderme	present	présente	vorhanden	Adams, Ruby	9
	Essreife Frucht: Glanz der Farbe der Schale					
ZA: could combine with 74 and change to: ,even 1, slightly blotchy 2, strongly blotchy 3'						
73.	Ripe fruit: pattern of skin color	even	uniforme	einheitlich		1
		speckled	tachetée	gefleckt		2
	Fruit mûr: répartition de la couleur de l'épiderme					
Essreife Frucht: Verteilung der Farbe der Schale						
74.	Ripe fruit: degree of speckling of skin color	weak	faible	gering		3
		medium	moyen	mittel		5
	Fruit mûr: densité de la tâcheture de l'épiderme	strong	fort	stark		7
Essreife Frucht: Dichte der Fleckung der Farbe der Schale						

	Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
75.	Ripe fruit: thickness of skin	thin	fin	dünn	Adams, Carrie, Florigon	3
	Fruit mûr: épaisseur de l'épiderme	medium	moyen	mittel	Sabre, Sheil	5
		thick	épais	dick	Haden	7
	Essreife Frucht: Dicke der Schale					
76.	Ripe fruit: adherence of skin to flesh	weak	faible	gering	Peach	3
		medium	moyenne	mittel		5
	Fruit mûr: adhérence de l'épiderme à la chair	strong	forte	stark	Fascell, Sheil, Zill	7
	Essreife Frucht: Anhaf- ten der Schale am Fleisch					
ZA: changed						
(*) 77.	Ripe fruit: main color of flesh	greenish yellow	jaune verdâtre	grünlichgelb		1
	Fruit mûr: couleur principale de la chair	light yellow	jaune pâle	hellgelb		2
		medium yellow	jaune	gelb		3
	Essreife Frucht: Haupt- farbe des Fleisches	light orange	orange pâle	hellorange	Extrema	4
		medium orange	orange	orange		5
		dark orange	orange foncée	dunkelorange		6
78.	Ripe fruit: firmness of flesh	soft	molle	weich	Carrie, Sheil	3
		medium	moyenne	mittel	Haden, Zill	5
	Fruit mûr: fermeté de la chair	firm	ferme	fest	Peach, Sensation, Tommy Atkins	7
	Essreife Frucht: Festigkeit des Fleisches					
79.	Ripe fruit: juiciness	dry	sec	trocken		3
	Fruit mûr: succulence	medium	moyen	mittel	Tommy Atkins	5
	Essreife Frucht: Saf- tigkeit	juicy	juteux	saftig	Carrie	7
80.	Ripe fruit: texture of flesh	fine	fine	fein	Adams, Fascell	3
		medium	moyenne	mittel	Tommy Atkins	5
	Fruit mûr: texture de la chair	coarse	grossière	grob	Sheil	7
	Essreife Frucht: Textur des Fleisches					

	Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
(*) 81.	Ripe fruit: amount of non-fleshy fibre in flesh attached to stone	very low	très faible	sehr klein	Kent, Zill	1
		low	faible	klein	Tommy Atkins	3
	Fruit mûr: importance de la fibre non-charnue de la chair attachée au noyau	medium	moyenne	mittel	Sabre	5
		high	forte	gross		7
	Essreife Frucht: Anteil der am Kern anliegenden nichtfleischigen Fasern des Fleisches	very high	très forte	sehr gross	Kidney, Peach	9
82.	Ripe fruit: amount of fleshy fibre beneath the skin	low	faible	klein	Kent	3
		medium	moyenne	mittel		5
	Fruit mûr: importance de la fibre charnue au-dessous de l'épiderme	high	forte	gross	Sheil, Tommy Atkins	7
	Essreife Frucht: Anteil der fleischigen Fasern unter der Schale					
(*) 83.	Ripe fruit: turpentine flavor	absent	absente	fehlend	Kent, Sensation	1
		present	présente	vorhanden	Extrema, Sandersha	9
	Fruit mûr: saveur térébenthine					
	Essreife Frucht: Terpentingeschmack					
ZA: should we say seed or stone? To check. We don't think we need so many stone chars. Could delete 84, 86, 88, 89, 90, 91, 92.						
84.	Stone: prominence of point at stylar area	weak	faible	gering	Adams, Hood	3
		medium	moyenne	mittel	Sensation, Tommy Atkins	5
	Noyau: netteté de la pointe à l'extrémité stylaire	strong	forte	stark	Carrie, Zill	7
	Kern: Ausprägung der Spitze an der Griffelzone					
85.	Stone: relief of surface	grooved	cannelé	gefurcht	Extrema, Sabre, Zill	3
		smooth	lisse	glatt	Ruby	5
	Noyau: relief de la surface	ridged	annelé	geringelt	Irwin, Tommy Atkins	7
	Kern: Relief der Oberfläche					

	Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielssorten	Note
86.	Stone: sharp points on surface	absent	absentes	fehlend	Peach, Ruby	1
	Noyau: pointes sur la surface	present	présentes	vorhanden	Tommy Atkins, Zill	9
	Kern: scharfe Spitzen auf der Oberfläche					
ZA: changed						
87.	Stone: length of fibre on lateral sides	very short	très courtes	sehr kurz		1
		short	courtes	kurz	Zill	3
	Noyau: longueur des fibres sur les joues	medium	moyennes	mittel	Anderson	5
	Kern: Länge der Fasern an den Wangen	long	longues	lang	Sabre	7
		very long	très longues	sehr lang	Peach	9
(ZA: ‚lateral sides‘ if it is not deleted)						
88.	Stone: density of fibre on cheeks	very sparse	très faible	sehr locker		1
		sparse	faible	locker	Fascell, Zill	3
	Noyau: densité des fibres sur les joues	medium	moyenne	mittel	Sabre, Tommy Atkins	5
	Kern: Dichte der Fasern an den Wangen	dense	forte	dicht	Hood, Sensation	7
		very dense	très forte	sehr dicht	Peach	9
89.	Stone: texture of fibre	fine	fine	fein	Sabre, Tommy Atkins	3
	Noyau: texture de la fibre	medium	moyenne	mittel		5
		coarse	grosse	grob	Sensation	7
	Kern: Textur der Faser					
90.	Stone: thickness of endocarp	very thin	très fin	sehr dünn	Ruby	1
		thin	fin	dünn	Irwin	3
	Noyau: épaisseur de l'endocarpe	medium	moyen	mittel	Carrie, Sensation	5
	Kern: Dicke des Endokarps	thick	épais	dick		7
		very thick	très épais	sehr dick	Irwin, Sabre	9
(*) 91.	Seed: length in relation to that of stone	short	courte	kurz	Tommy Atkins	3
		medium	moyenne	mittel		5
	Pépin: longueur par rapport à celle du noyau	long	longue	lang	Sensation	7
	Samen: Länge im Verhältnis zu der des Kernes					

	Characteristics Caractères Merkmale	English	français	deutsch	Example Varieties Exemples Beispielsorten	Note
(ZA: state 3 to read ,strongly kidney-shaped‘ if it is not deleted)						
92.	Seed: shape	oblong	rectangulaire	rechteckig	Sabre	1
	Semence: forme	slightly kidney-shaped	faiblement réniforme	leicht nieren- förmig		2
	Samen: Form	kidney-shaped	réniforme	nierenförmig	Sensation	3
(*) 93.	Seed: polyembryony	absent	absente	fehlend	Sensation, Tommy Atkins	1
	Semence: polyembryonnie	présent	présente	vorhanden	Peach, Sabre	9
	Samen: Polyembryonie					
94.	Time of first flowering	early	précoce	früh	Early Gold	3
	Epoque de début de floraison	medium	moyenne	mittel	Fascell	5
	Zeitpunkt des Blühbe- ginns	late	tardive	spät	Sensation	7
(*) 95.	Time of fruit maturity	very early	très précoce	sehr früh	Early Gold, Florigon	1
	Epoque de maturité des fruits	early	précoce	früh	Zill	3
	Zeitpunkt der Frucht- reife	medium	moyenne	mittel	Fascell, Nimrod, Tommy Atkins	5
		late	tardive	spät	Sensation	7
		very late	très tardive	sehr spät	Keitt	9

8. Explanations on the Table of Characteristics

Ad 5–27: Characteristics of the leaf

	tip	
		apex
		midrib
length		blade
		secondary veins
		reticulate veins
		base
		petiole
	width	

Ad 5+15: Leaf: shape in cross section

1
straight

2
concave

Ad 6 : Young leaf: relief of upper face

3
a b
sunken between
secondary veins

5
a b
smooth

7
a b
raised between
secondary veins

Ad 12: Fully developed leaf: predominant shape

1
trullate to ovate

2
elliptic

3
oblong

Ad.14: Fully developed leaf: twisting of blade

1
absent

9
present

Ad 16: Fully developed leaf: symmetry

1
asymmetric

2
symmetric

Ad. 17: Fully developed leaf: curvature of midrib

1
absent

9
present

Ad. 18: Fully developed leaf: position of curvature of midrib

1
apical

2
basal

3
from apex to base

Ad. 19: Fully developed leaf: relief of upper side

1
smooth

9
raised between secondary veins

Ad. 23: Fully developed leaf: shape of tip

1
attenuate

2
acuminate

3
acute

Ad. 24: Fully developed leaf: shape of base

1
acute

2
obtuse

3
rounded

Ad. 43 to 69: Characteristics of the mature fruit

	branch of infructescence
	fruit stalk
base	right shoulder
	left shoulder
middle section	cheek
	sinus
apex	stylar scar

Ad. 43-45: Mature fruit: length (= L) and width (= W)

Ad. 46: Mature fruit: shape in cross section

3
narrow elliptic

5
broad elliptic

7
circular

Ad. 55: Mature fruit: depth of stalk cavity

3
shallow

5
medium

7
deep

Ad. 57: Mature fruit: prominence of neck

3
weak

5
medium

7
strong

Ad. 58 + 59: Mature fruit: shape of left (58) and right (59) shoulder

1
rounded upward

3
rounded outward

5
rounded downward

7
sloping downward

9
falling abruptly

Ad. 60: Mature fruit: groove in left shoulder

1
absent

9
present

Ad. 63: Mature fruit: lumpiness on left shoulder

1
absent

9
present

Ad. 64: Mature fruit: sinus proximal of stylar scar

stylar scar

1
absent

sinus

stylar scar

9
present

Ad. 66: Mature fruit: bulge proximal of stylar scar

stylar scar

1
absent

bulge

stylar scar

9
present

9. Literature

Gangolly, S.R., Singh, R., Katyal, S.L., Singh, D., 1957: "The Mango," Indian Council of Agricultural Research, New Delhi, India, pp. 19-459

Kurup, C.G.R. (Chief Editor), 1967: "The Mango: A Handbook," Indian Council of Agricultural Research, New Delhi, India, pp. 14-31

"Mango Number," Punjab Fruit Journal, nn. 82-83, 1960

Naik, K.C., Gangolly, S.R., 1950: "A Monograph on Classification and Nomenclature of South Indian Mangoes", Superintendent, Government Press, Madras, India, pp. 36-273

Singh, L.B., 1960: "The Mango: Botany, Cultivation and Utilization," Interscience Publishers, Leonard Hill, London, GB, New York, US, pp. 91-142

Singh, L.B., 1969: "Mango, Outlines of Perennial Crop Breeding in the Tropics," Misc. Papers, 4. Landbouwhogeschool Edit., Wageningen, NL

Valmayor, R., 1962: "The Mango: Its Botany and Production," University of the Philippines, College, Laguna

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

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
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4. Information on the breeding scheme and propagation of the variety

4.1 Breeding Scheme

4.1.1 Variety resulting from:

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

4.1.2 Mutation [] (please state parent variety)

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

4.1.4 Other [] (please provide details)

4.2 Method of Propagating the Variety

4.2.1 *In vitro* propagation

The plant material of the candidate variety has been obtained
 by *in vitro* propagation yes []
no []

4.2.2 Other type of multiplication (seed, leaf cutting, hardwood cutting, layer): [] (please specify)

.....

4.3 Virus status []

4.3.1 The variety is free from all known viruses as follows: [] (indicate from which viruses)

.....

4.3.2 The plant material is virus tested (indicate against which viruses): []

.....

4.3.3 The virus status is unknown []

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 Mature fruit: length/width ratio (45)		
very low	Extrema, Santa Alexandrina	1[]
low	Fascell, Sheil	3[]
medium	Sensation, Tommy Atkins	5[]
high	Carrie, Gouveia	7[]
very high	Anderson, Sabre	9[]
5.2 Mature fruit: shape of left shoulder (58)		
rounded upward	Tommy Atkins	1[]
rounded outward	Florigon, Palmer, Zill	3[]
rounded downward	Keitt, Ruby, Sandersha	5[]
sloping downward		7[]
falling abruptly		9[]
5.3 Mature fruit: shape of right shoulder (59)		
rounded upward		1[]
rounded outward	Fascell	3[]
rounded downward	Ruby, Zill	5[]
sloping downward	Keit	7[]
falling abruptly	Palmer, Sandersha	9[]
5.4 Mature fruit: sinus proximal of stylar scar (64)		
absent	Fascell, Hood, Kent	1[]
present	Gouveia, Sabre, Sandersha	9[]

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 Special conditions for the examination of the variety

7.2.1 Are there any special conditions for growing the variety or conducting the examination?

Yes [] No []

7.2.2 If yes, please give details:

7.3 Other information

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. 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]