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GENEVA

TECHNICAL WORKING PARTY FOR FRUIT CROPS

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WORKING PAPER ON REVISED TEST GUIDELINES FOR GRAPEFRUIT AND PUMMELOS AND HYBRIDS
(*Citrus paradisi* Macfad. (Grapefruit), *Citrus grandis* (L.) Osbeck (Pummelos))

Document prepared by experts from South Africa

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I. Subject of these Guidelines

1. These Test Guidelines apply to all vegetatively propagated varieties for fruit production and rootstock varieties of the following group of the genus Citrus L.:

Grapefruit and Pummelos and their hybrids
GRA: *Citrus paradisi* Macfad. (Grapefruit)
PUM: *Citrus grandis* (L.) Osbeck (Pummelos)

These Test Guidelines may be used for the testing of varieties of other citrus groups for which UPOV Test Guidelines are not yet available, after having studied which of the characteristics indicated show reliable and useful results and whether further characteristics should be added.

II. Material Required

1. The competent authorities decide when, where and in what quantity and quality the plant material required for testing the variety is to be delivered. Applicants submitting material from a State other than that in which the testing takes place must make sure that all customs formalities are complied with. As a minimum, the following quantity of plant material is recommended:

bud sticks of 6 to 10 mm in diameter (one year old), each cut just behind a typical fruit, sufficient to establish 10 plants or, if required by the competent authorities, 10 one-year-old grafted trees. In the case of rootstock varieties, rooted cuttings or polyembryonic seeds may be required in addition.

2. The plant material supplied should be visibly healthy, not lacking in vigor or affected by any important pests or diseases. It should preferably not be obtained from *in vitro* propagation. If it has been produced by *in vitro* propagation this fact has to be stated by the applicant.

3. The plant material must not have undergone any treatment unless the competent authorities allow or request such treatment. If it has been treated, full details of the treatment must be given.

III. Conduct of Tests

1. To assess distinctness, it is essential for the trees under test to bear a satisfactory crop of fruit for at least two growing periods.

2. The tests should normally be conducted at one place. If any important characteristics of the variety cannot be seen at that place, the variety may be tested at an additional place.

3. The tests should be carried out under conditions ensuring normal growth. As a minimum, each test should include a total of 5 trees. Separate plots for observation and for measuring can only be used if they have been subject to similar environmental conditions. A standard specified rootstock should be used for each group.

4. Additional tests for special purposes may be established.

IV. Methods and Observations

1. Unless otherwise stated, all observations determined by measurement, weighing or counting should be made on 5 plants or 10 typical parts, 2 from each of 5 plants.

2. For the assessment of uniformity a population standard of 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.

3. All observations should be made on plants of the same age not less than 3 years old. The age of the plants should be specified.

4. The observation on the growth habit of the tree should be made immediately after harvest.

5. All observations on the young leaf should be made on actively growing spring flush.

6. All observations on the leaf should be made on fully developed leaves on the middle third of the youngest spring flush branch sections not showing signs of active growth.

7. Unless otherwise indicated, all observations on the flower bud and the flower should be made on the terminal flower bud and flower, at the time of full flowering of the variety.

8. All observations on the flower bud should be made when the petal tips are just visible.

9. All observations on the open flower should be made on the first day of opening.

10. All observations on the fruit should be made at the stage of optimum ripeness. This stage should be determined by the ratio total soluble solids/acid content of juice. The fruit should be tested weekly and harvested as soon as this stage has been reached.

11. All fruits for observation should be taken from the periphery of the tree and fruit misformed as a result of clustering should not be sampled.

12. All observations on the fruit surface and on the texture and thickness of the rind should be made at the middle, between the base and apex of the fruit.

13. All observations on the flesh of the fruit should be made on a cross section through the middle of the fruit.

14. All observations on the seed should be made on the fresh seed.

V. Grouping of Varieties

1. The collection of varieties to be grown should be divided into groups to facilitate the assessment of distinctness. In the first place the collection should be divided into the groups mentioned in Chapter I (1).

2. In addition, characteristics which are suitable for grouping purposes are those which are known from experience not to vary, or to vary only slightly, within a variety. Their various states of expression should be fairly evenly distributed throughout the collection.

3. It is recommended that the competent authorities use the following characteristics for grouping fruit varieties:

(a) Fruit: length (characteristic 33)
(b) Fruit: diameter (characteristic 34)
(c) Fruit surface: predominant color (characteristic 72)
(d) Fruit: main color of flesh (characteristic 97)
(e) Time of maturity of fruit for consumption (characteristic 125)

VI. Characteristics and Symbols

1. To assess distinctness, uniformity and stability, the characteristics and their states as given in the Tables of Characteristics should be used.

2. Notes (numbers), for the purposes of electronic data processing, are given opposite the states of expression for each characteristic.

3. Each example variety is followed by the abbreviation of its group in brackets.

4. Legend:

(*) Characteristics that should be used on all varieties in every growing period over which examinations are made and always be included in the variety descriptions, except when the state of expression of a preceding characteristic or regional environmental conditions render this impossible. The asterisk (*) is applicable to fruit varieties only and not to rootstock varieties.

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

5. Abbreviations:

GRA: *Citrus paradisi* Macfad. - Grapefruit
PUM: *Citrus grandis* (L.) Osbeck – Pummelos

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

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
1. (*)	**Tree: growth habit**					
[2.]	upright					1
	spreading					2
	drooping					3
2.	**Tree: density of spines**					
[3.]	absent or very sparse					1
	sparse					2
	dense					3
3.	**Tree: length of spines**					
	short					3
	medium					5
	long					7
4. (*)	**Young leaf: presence of anthocyanin coloration**					
[4.]	absent					1
	present					9
5.	**Young leaf: intensity of anthocyanin coloration**					
[4a.]	weak					3
	medium					5
	strong					7

6.	**Leaf blade: length**	
[5.]	short	3
	medium	5
	long	7
7.	**Leaf blade: width**	
[6.]	narrow	3
	medium	5
	broad	7
8.	**Leaf blade: ratio length/ width**	
[7.]	small	3
	medium	5
	large	7
9.	**Leaf blade: shape**	
[8.]	straight or very weakly concave	1
	weakly concave	2
	strongly concave	3
10.	**Leaf blade: twisting**	
[9.]	absent or very weakly expressed	1
	weakly expressed	2
	strongly expressed	3
11.	**Leaf blade: blistering**	
[10.]	absent or very weakly expressed	1
	weakly expressed	2
	strongly expressed	3

12.	**Leaf blade: intensity of green color**	
[11.]	light	3
	medium	5
	dark	7
13.	**Leaf blade: pubescence on lower side**	
[12.]	absent or very weakly expressed	1
	weakly expressed	2
	strongly expressed	3
14.	**Leaf blade: firmness**	
[13.]	weak	3
	medium	5
	strong	7
15.	**Leaf blade: undulation of margin**	
[14.]	absent or very weakly expressed	1
	weakly expressed	2
	strongly expressed	3
16.	**Leaf blade: incisions of margin**	
[15.]	absent or very shallow	1
	shallow	2
	deep	3

17. **(+)**	**Leaf blade: shape of apex**		
[16.]	acuminate		1
	acute		2
	obtuse		3
	rounded		4
18. **(+)**	**Leaf blade: emargination at tip**		
[17.]	absent or very shallow		1
	shallow		2
	deep		3
19.	**Petiole: length**		
[18.]	short		3
	medium		5
	long		7
20.	**Petiole: presence of wings**		
[19.]	absent		1
	present		9
21.	**Petiole: width of wings**		
[19a.]	narrow		3
	medium		5
	broad		7
22.	**Flower bud: presence of anthocyanin coloration**		
[21.]	absent	All ZA vars.	1
	present	Any examples?	9

23.	**Flower bud: intensity of anthocyanin coloration**	Any examples?	
[21a.]	weak		3
	medium		5
	strong		7
24.	**Flower: diameter of calyx**		
[23.]	small	Nelruby, Star Ruby	3
	medium	Oroblanco	5
	large	Pomelit	7
25.	**Flower: length of petal**		
[24.]	short	Marsh, Nelruby, Ruby Henninger	3
	medium		5
	long	Melogold, Pomelit, Tahiti ?	7
26.	**Flower: width of petal**		
[25.]	narrow		3
	medium		5
	broad	Melogold, Pomelit	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
27.	**Flower: ratio length/width of petal**					
	small					3
	medium					5
	large					7

28.	**Flower: length of stamens**	
[27.]	short	3
	medium	5
	long	7
29.	**Anther: color**	
[28.]	white	1
	light yellow	2
	medium yellow	3
30. (*)	**Anther: viable pollen**	
[29.]	absent	1
	present	9
31.	**Style: length**	
[31.]	short	3
	medium	5
	long	7
32.	**Infructescence: clustering of fruits**	
	absent	1
	present	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
33.	**Fruit: length**					
(*)	short				Oran Red ?	3
[34.]	medium				Ray Ruby	5
	long				Pomelit	7

34. **(*)**	**Fruit: diameter**					
[35.]	small				Oran Red ?	3
	medium				Melogold, Tahiti ?	5
	large				Chandler	7
35. **(*)**	**Fruit: ratio length/diameter**					
[36.]	small				Oroblanco	3
	medium				Melogold	5
	large					7
36. **(*)**	**Fruit: position of broadest part**					
[37.]	towards stalk end					1
	at middle				Nartia, Red Blush	2
	towards distal end				Ray Ruby, Ruben	3
37.	**Fruit: circumference**					
	Not for Group 4					
38. **(*)** **(+)**	**Fruit: general shape of proximal part (excluding neck, collar and depression at stalk end)**					
[39.]	flattened				Oroblanco	1
	slightly rounded				Marsh, Redblush	2
	strongly rounded					3
	tapered				Ray Ruby	4

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
39. **(*)** **(+)**	**Fruit: presence of depression at stalk end**					
[40.]	absent				Pomelit?, Redblush?	1
	present				Ray Ruby	9

40.	**Fruit: depth of depression at stalk end**					
[41.]	shallow				Melogold, Nelruby, Oroblanco, Ruby Henninger	3
	medium				Ray Ruby	5
	deep					7
41.	**Fruit: presence of neck** **Not for group 4**					
42.	**Fruit: length of neck** **Not for Group 4**					
43.	**Fruit: thickness of neck** **Not for Group 4**					
44. **(+)**	**Fruit: presence of constriction at stalk end** **Not for Group 4**					
45.	**Fruit: expression of constriction at stalk end** **Not for Group 4**					

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
46.	**Fruit: number of radial grooves at stalk end**					
	absent or very few					1

	few	2
	many	3
47.	**Fruit: length of radial grooves at stalk end**	
	short	3
	medium	5
	long	7
48. **(+)**	**Fruit: local depression at stalk attachment (necked varieties only)**	
	Not for Group 4	
49.	**Fruit: presence of collar**	
	Not for Group 4	
50.	**Fruit: height of collar**	
	Not for Group 4	
51.	**Fruit: diameter of collar**	
	Not for Group 4	
52.	**Fruit: abscission layer between floral disc and fruit**	
[49.]	absent or very weakly developed	1
	weakly developed	2
	strongly developed	3

English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota

53.	**Fruit: general shape of distal part (excluding nipple, bulging of navel and depression at distal end)**		
	flattened	Melogold, Oroblanco, Pomelit, Ray Ruby	1
	slightly rounded	Marsh, Redblush	2
	strongly rounded		3
54.	**Fruit: presence of depression at distal end**		
	absent	Henderson?, Star Ruby	1
	present	Melogold	9
55.	**Fruit: depth of depression at distal end**		
	shallow	Oroblanco	3
	medium	Melogold	5
	deep		7
56.	**Fruit: diameter of depression at distal end**		
	small		3
	medium		5
	large		7
57.	**Fruit: presence of nipple**		
	Not for Group 4		
58.	**Fruit: prominence of nipple**		
	Not for Group 4		

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
59.	**Fruit: presence of areola**					
	absent				Chandler, Marsh, Pomelit	1
	present				Flame, Rio Red	9
60. (+)	**Fruit: type of areola**					
	smooth				Flame, Rio Red	1
	grooved					2
	ridged					3
61.	**Fruit: conspicuousness of areola**					
[58.]	weak					1
	medium				Flame, Rio Red	2
	strong					3
62.	**Fruit: development of areola**				Delete?	
[59.]	not complete					1
	complete					2
63.	**Fruit: diameter of areola**					
[60.]	small					3
	medium					5
	large					7
64.	**Fruit: diameter of stylar scar**					
[61.]	small					3
	medium					5
	large					7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
65.	**Fruit: protruding stylar point** **Not for Group 4**					
66.	**Fruit: persistence of style** **Not for Group 4**					
67.	**Fruit: presence of navel opening** **Not for Group 4**					
68.	**Fruit: diameter of navel opening** **Not for Group 4**					
69.	**Fruit: bulging of navel** **Not for Group 4**					
70.	**Fruit: presence of radial grooves at distal end** **Not for Group 4**					
71.	**Fruit: expression of radial grooves at distal end** **Not for Group 4**					

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
72.	**Fruit surface: predominant color**					
	yellow green					1
	light yellow				Melogold, Oroblanco, Pomelit	2
	medium yellow				Marsh, Nartia	3
	dark greenish yellow				Tahiti ?	4
	light pink blush				Flame, Henderson, Ruby Henninger (best example)	5
	medium pink blush				Nelruby?, Oran Red ?, Rio Red (best example)	6
	dark pink blush				Star Ruby (good example)	7
73.	**Fruit surface: presence of pubescence** **Not for Group 4**					
74.	**Fruit surface: intensity of pubescence** **Not for Group 4**					

[69b.]

75. **(*)**	**Fruit surface: glossiness**					
[70.]	absent or very weak					1
	weak					3
	medium					5
	strong					7
	very strong					9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
76.	**Fruit surface: roughness**					
[71.]	smooth				Nartia, Ruby Henninger	3
	medium				Oroblanco, Ray Ruby?	5
	rough				Tahiti ?	7
77.	**Fruit surface: evenness of size of oil glands**					
[72.]	all more or less the same size				Melogold, Tahiti ?	1
	larger ones interspersed by smaller ones				Ray Ruby, Star Ruby	2
78.	**Fruit surface: size of larger oil glands**					
[73.]	small					3
	medium				Pomelit, Ruby Henninger	5
	large				Melogold	7
79.	**Fruit surface: conspicuousness of larger oil glands**					
[74.]	weak				Marsh, Nartia	3
	medium				Ray Ruby, Ruby Henninger	5
	strong				Chandler, Star Ruby, Tahiti ?	7

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
80.	**Fruit surface: presence of pitting and pebbling on oil glands**					
[75.]	pitting and pebbling absent					1
	pitting absent, pebbling present					2
	pitting present, pebbling absent					3
	pitting and pebbling present					4
81.	**Fruit surface: density of pitting on oil glands**					
[76.]	sparse					3
	medium				Ray Ruby	5
	dense					7
82.	**Fruit surface: depth of pitting on oil glands**					
[77.]	shallow				Flame	3
	medium				Ray Ruby	5
	deep					7
83.	**Fruit surface: density of pebbling on oil glands**					
[77a.]	sparse					3
	medium					5
	dense					5

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
84.	**Fruit surface: degree of pebbling on oil glands**					
[78.]	weak				Ruby Henninger, Star Ruby	3
	medium				Ray Ruby	5
	strong				Tahiti ?	7
85. (*)	**Fruit rind: thickness**					
[80.]	thin					3
	medium				Flame	5
	thick				Oroblanco	7
86. (*)	**Fruit rind: adherence to flesh**					
[82.]	weak					3
	medium					5
	strong					7
87.	**Fruit rind: strength** **Not for group 4**					
[83.]						
88.	**Fruit rind: oiliness** **Not for group 4**					
[84.]						
89.	**Fruit rind: conspicuousness of oil glands on inner surface** **Not for Group 4**					

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
90. [86.]	**Fruit: color of albedo**					
	white				Marsh, Melogold, Oroblanco	1
	light pink				Ray Ruby, Red Blush, Ruby Henninger	2
	medium pink				Star Ruby	3
91.	**Fruit: density of albedo** **Not for Group 4**					
92. [88.]	**Fruit: amount of albedo adhering to flesh (strands excluded)** **Not for Group 4**					
93.	**Fruit: presence of albedo strands** **Not for Group 4**					
94.	**Fruit: amount of albedo strands** **Not for Group 4**					
95.	**Fruit: differently colored specks in flesh**					
[90.]	absent					1
	present					9
96.	**Fruit: bicolored segments**					
[91.]	absent				Marsh, Star Ruby	1
	present				Pomelit	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
97. (*)	**Fruit: main color of flesh**					
[92.]	light green				Tahiti ?	1
	whitish				Marsh, Melogold, Oroblanco	2
	light pink				Ray Ruby, Red Blush, Ruben, Ruby Henninger	3
	medium pink				Henderson, Nelruby, Oran Red ?	4
	dark pink				Star Ruby	5
	whitish and pink				Pomelit	6
98.	**Fruit: filling of core**					
[93.]	absent or very sparse					1
	sparse				Ray Ruby, Ruben	3
	medium				Nartia, Nelruby, Star Ruby	5
	dense				Tahiti ?	7
	very dense					9
99.	**Fruit: diameter of core**					
[94.]	small					3
	medium					5
	large					7

100.	**Fruit: rudimentary segments**					
[95.]	absent or very weakly expressed					1
	weakly expressed					2
	strongly expressed				Tahiti ?	3

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
101.	**Fruit: number of well developed segments**					
[96.]	few					3
	medium					5
	many					7
102.	**Fruit: coherence of adjacent segment walls** **Not for group 4**					
[98.]	weak					3
	medium					5
	strong					7
103.	**Fruit: strength of segment walls**					
[99.]	weak					3
	medium					5
	strong					7
104.	**Fruit: length of juice vesicles**					
[100.]	short					3
	medium					5
	long					7

105.	**Fruit: thickness of juice vesicles**	
[100a	thin	3
	medium	5
	thick	7
106.	**Fruit: conspicuousness of juice vesicle walls**	
[101.]	low	3
	medium	5
	high	7
107.	**Fruit: coherence of juice vesicles**	
[102.]	weak	3
	medium	5
	strong	7
108. (*)	**Fruit: presence of navel viewed <u>internally</u>**	
	Not for Group 4	
109.	**Fruit: size of navel (viewed internally)**	
	Not for Group 4	
110.	**Fruit: juice content**	
[106.]	low	3
	medium	5
	high	7
111.	**Fruit juice: total soluble solids**	
[107.]	low	3
	medium	5
	high	7

112.	**Fruit juice: acidity**		
[108.]	low		3
	medium		5
	high		7
113.	**Fruit: strength of fibre**		
[109.]	weak		3
	medium		5
	strong		7
114.	**Fruit: number of seeds**		
[110.]	absent or very few	Melogold, Oroblanco, Ray Ruby	1
	few	Marsh, Nartia, Nelrruby, Red Blush	3
	medium		5
	many		7
	very many	Chandler, Tahiti ?	9
115. (*)	**Seed: polyembryony**		
[111.]	absent		1
	present		9
116.	**Seed: length**		
[113.]	short	Flame, Henderson	3
	medium	Nelruby	5
	long	Chandler, Mellow Gold, Pomelit, Tahiti ?	7
117.	**Seed: width**		
[114.]	narrow		3
	medium	Henderson	5
	broad	Nartia	7

118.	**Seed: surface (when fresh)**	
[115.]	smooth	1
	veined	2
	wrinkled	3
119.	**Seed: prominence of veins and/or wrinkles (as for 118)**	
[116.]	weak	3
	medium	5
	strong	7
120.	**Seed: external color (as for 118)**	
[117.]	greenish	1
	whitish	2
	yellowish	3
	pinkish	4
	brownish	5
121.	**Seed: color of inner seed coat (as for 118)**	
[118.]	white	1
	light yellow	2
	light brown	3
	brown	4
	dark brown	5
	red	6
	purple	7

122.	**Seed: color of cotyledons (as for 118, polyembryonic varieties only)**	
[119.]	white	1
	cream	2
	light green	3
	dark green	4
123.	**Seed: external color when <u>dry</u>**	
	Deleted from all groups	
[120.]	greenish	1
	whitish	2
	yellowish	3
	brownish	4
124.	**Flowering habit**	
(*)	flowering once	1
[121.]	flowering more than once	2
125.	**Time of maturity of fruit for consumption**	
(*)		
[122.]	early	3
	medium	5
	late	7
126.	**Plant: parthenocarpy**	
(*)		
[122a	absent	1
	present	9

	English	français	deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
127.	**Plant: self-incompatability**					

new	absent	1
	present	9

VIII. Explanations on the Table of Characteristics

Ad. 17: Leaf blade: shape of apex (as for 6)

1	2
acuminate	acute
3	4
obtuse	rounded

Ad. 18: Leaf blade: emargination at tip **ZA suggested to delete**

1	2	3
absent or very shallow	shallow	deep

Ad. 38: Fruit: general shape of proximal part (excluding neck, collar and depression at stalk end)

1	2	3	4
flattened	slightly rounded	strongly rounded	tapered

Ad. 39: Fruit: presence of depression at stalk end

1	9
absent	present

Ad. 53: Fruit: general shape of distal part (excluding nipple, bulging of navel and depression at distal end)

1	2	3
flattened	slightly rounded	strongly rounded

Ad. 54: Fruit: presence of depression at distal end

1	9
absent	present

Ad. 60: Fruit: type of areola

1	2	3
smooth	grooved	ridged

List of Groups of Citrus Varieties

GROUP

1. MANDARINS AND THEIR HYBRIDS
SAT: *Citrus unshiu* Marc. (Satsumas)
CLE: *Citrus clementina* Hort. ex Tan. (Clementines)
MMN**:** *Citrus deliciosa* Ten. (Mediterranean Mandarins)
PMN*:* *Citrus reticulata* Blanco (Ponkan Mandarins)
TNL: Tangerine x (Grapefruit or Pummelo) (Tangelos)
TNR: Tangerine x Orange (Tangors)
HOM: Other Mandarin Hybrids

2. ORANGES AND THEIR HYBRIDS
SWO: *Citrus sinensis* (L.) Osbeck (Sweet Oranges)
SOR: *Citrus aurantium* L. (Sour Oranges)
HOR: Other Orange Hybrids

3. LEMONS AND LIMES AND THEIR HYBRIDS
LEM: *Citrus limon (*L.) Burm.f. (Lemons)
LAL: *Citrus latifolia* Tan. (Acid Limes, Lime Bearss)
SWL: *Citrus limettioides* Tan. (Sweet Limes)
SAL: *Citrus aurantifolia* (Christm. ex Panz.) Swingle (Mexican Limes)
RLM: *Citrus jambhiri* Lush. (Rough Lemons)
HOL: Other Lemon and Lime Hybrids

4. GRAPEFRUIT AND PUMMELOS AND THEIR HYBRIDS
GRA: *Citrus paradisi* Macfad. (Grapefruit)
PUM: *Citrus grandis* (L.) Osbeck (Pummelos)

NZ comment 2000: To check Citrus maxima.
TWF comment 2000: To supply common names in all four languages.

5. TRIFOLIATE ORANGES AND THEIR HYBRIDS
PON: *Poncirus* Raf. (Trifoliate Oranges)
CTG: *Poncirus* x Sweet Orange (Citranges)
CML: *Poncirus* x Grapefruit (Citrumelos)
CTL: *Poncirus* x Lemons (Citremons)
CTI: *Poncirus* x Mandarin (Citrandarins)
HOP: Other *Poncirus* Hybrids

IX. Literature

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X. Technical Questionnaire

	Reference Number (not to be filled in by the applicant)

TECHNICAL QUESTIONNAIRE
to be completed in connection with an application for plant breeders' rights

1. GROUP

GRAPEFRUIT AND PUMMELOS AND THEIR HYBRIDS

GRA: *Citrus paradisi* Macfad. (Grapefruit) [ ]

PUM: *Citrus grandis* (L.) Osbeck (Pummelos) [ ]

2. Applicant (name and address)

3. Proposed denomination or breeder's reference

4. Information on origin, maintenance and reproduction of the variety

4.1 Origin

(a) Seedling of unknown parentage [ ]

(b) Produced by controlled pollination [ ]
(indicate parent varieties)

–Seed bearing parent (indicate parent)

.....

– Pollen parent (indicate parent)

.....

(c) Produced by open pollination of [ ]
(indicate seed bearing parent plant)

.....

(d) Mutation or sport from (indicate original parent variety)

..... [ ]

(e) Discovery (indicate where and when)

..... [ ]

4.2 *In vitro* propagation

The plant material of the candidate variety has been obtained

by *in vitro* propagation yes [ ]
no [ ]

4.4 Virus status

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

.....

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

.....

(c) The virus status is unknown [ ]

4.5 Other information

5. Characteristics of the variety to be indicated (the number in brackets refers to the corresponding characteristic in Test Guidelines; please mark the state of expression which best corresponds).

	Characteristics	Example Varieties	Note
5.1 (33)	**Fruit: length**		
	short	Oran Red ?	3[ ]
	medium	Ray Ruby	5[ ]
	long	Pomelit	7[ ]
5.2 (34)	**Fruit: diameter**		
	small	Oran Red ?	3[ ]
	medium	Melogold, Tahiti ?	5[ ]
	large	Chandler	7[ ]
5.3 (72)	**Fruit surface: predominant color**		
	yellow green		1[ ]
	light yellow	Melogold, Oroblanco, Pomelit	2[ ]
	medium yellow	Marsh, Nartia	3[ ]
	dark greenish yellow	Tahiti ?	4[ ]
	light pink blush	Flame, Henderson, Ruby Henninger (best example)	5[ ]
	medium pink blush	Nelruby?, Oran Red ?, Rio Red (best example)	6[ ]
	dark pink blush	Star Ruby (good example)	7[ ]

	Characteristics	Example Varieties	Note
5.4 (97)	**Fruit: main color of flesh**		
	light green	Tahiti ?	1[ ]
	whitish	Marsh, Melogold, Oroblanco	2[ ]
	light pink	Ray Ruby, Red Blush, Ruben, Ruby Henninger	3[ ]
	medium pink	Henderson, Nelruby, Oran Red ?	4[ ]
	dark pink	Star Ruby	5[ ]
	whitish and pink	Pomelit	6[ ]
5.5 (125)	**Time of maturity of fruit for consumption**		
	early		3[ ]
	medium		5[ ]
	late		7[ ]
5.6 (126)	**Plant: parthenocarpy**		
	absent		1[ ]
	present		9[ ]

6. Similar varieties and differences from these varieties

Denomination of similar variety	Characteristic in which the similar variety is different o)	State of expression of similar variety	State of expression of candidate variety

o) In the case of identical states of expressions of both varieties, please indicate the size of the difference.

7. Additional information which may help to distinguish the variety

7.1 Resistance to pests and diseases

7.2 Special conditions for the examination of the variety

7.3 Other information

A representative color photo of the variety should be included in the Technical Questionnaire.

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 that question is yes, please attach a copy of such an authorization.

[End of document]