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PARTIAL REVISION OF THE TEST GUIDELINES FOR MELON
(DOCUMENT TG/104/5)

Document prepared by experts from France and the Netherlands

1. The purpose of this document is to present the proposals for the partial revision of the Test Guidelines for Melon (document TG/104/5).

2. The following changes are proposed:

(a) Revision of grouping characteristics, including the behavior against pathogens

(b) a revised format for disease resistance characteristics according to the explanations for disease resistance characteristics in Test Guidelines and eventual new proposal to update the protocol

- Chapter 5: Grouping of Varieties and Organization of the Growing Trial
- Chapter 7: Table of Characteristics
- Chapter 8: Explanations on the Table of Characteristics
    - 8.2 Explanations for individual characteristics
- Chapter 10 : Technical Questionnaire
    - Paragraph 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).
    - Paragraph 7: Additional information which may help in the examination of the variety

3. The proposed revisions are presented in Annex I to this document.

4. Annex II to this document contains comments by the subgroup on the provisional draft of this document.

[Annex I follows]

ANNEX I

Proposal for a Revision of the Grouping Characteristics in Chapter 5.3

Current wording:

(a) Inflorescence: sex expression (at full flowering) (characteristic 12)
(b) Fruit: shape in longitudinal section (characteristic 28)
(c) Fruit: ground color of skin (characteristic 29)
(d) Fruit: warts (characteristic 38)
(e) Fruit: grooves (characteristic 43)
(f) Fruit: cork formation (characteristic 48)
(g) Fruit: main color of flesh (characteristic 54)
(h) Seed: length (characteristic 60)
(i) Seed: color (characteristic 63)

Proposed new wording:

(a) Inflorescence: sex expression (at full flowering) (characteristic 12)
(b) Fruit: shape in longitudinal section (characteristic 28)
(c) Fruit: ground color of skin (characteristic 29)
(d) Fruit: warts (characteristic 38)
(e) Fruit: grooves (characteristic 43)
(f) Fruit: cork formation (characteristic 48)
(g) Fruit: main color of flesh (characteristic 54)
(h) Seed: length (characteristic 60)
(i) Seed: color (characteristic 63)
(j) Resistance to *Fusarium oxysporum* f. sp. *melonis*, race 0 (characteristic 69.1)
(k) Resistance to *Fusarium oxysporum* f. sp. *melonis*, race 1 (characteristic 69.2)
(l) Resistance to *Fusarium oxysporum* f. sp. *melonis*, race 2 (characteristic 69.3)

Proposal to revise Characteristics 69 to 76

Current wording:

69. **(+)**	**VG**	**Resistance to *Fusarium oxysporum* f. sp. *melonis***	**Résistance à *Fusarium oxysporum* f. sp. *melonis***	**Resistenz gegen *Fusarium oxysporum* f. sp. *melonis***	**Resistencia al *Fusarium oxysporum* f. sp. *melonis***		
QL		---	---	---	---	---	---
69.1		**Race 0**	**Pathotype 0**	**Pathotyp 0**	**Raza 0**		
		absent	absente	fehlend	ausente	Jaune Canari 2	1
		present	présente	vorhanden	presente	Jador, Joker, Védrantais	9
		---	---	---	---	---	---
69.2		**Race 1**	**Pathotype 1**	**Pathotyp 1**	**Raza 1**		
		absent	absente	fehlend	ausente	Jaune Canari 2, Védrantais	1
		present	présente	vorhanden	presente	Jador, Joker	9
		---	---	---	---	---	---
69.3		**Race 2**	**Pathotype 2**	**Pathotyp 2**	**Raza 2**		
		absent	absente	fehlend	ausente	Jaune Canari 2, Joker	1
		present	présente	vorhanden	presente	Jador, Védrantais	9
		---	---	---	---	---	---
69.4		**Race 1-2**	**Pathotype 1-2**	**Pathotyp 1-2**	**Raza 1-2**		
(+)							
		absent	absente	fehlend	ausente	Jaune Canari 2 Joker, Védrantais	1
		present	présente	vorhanden	presente	Jador	9

Proposed new wording:

69. **(+)**	**VG**	**Resistance to *Fusarium oxysporum* f. sp. *melonis***	**Résistance à *Fusarium oxysporum* f. sp. *melonis***	**Resistenz gegen *Fusarium oxysporum* f. sp. *melonis***	**Resistencia al *Fusarium oxysporum* f. sp. *melonis***		
QL		----------	----------	----------	----------	----------	-------
69.1 (*)		**Race 0**	**Race 0**	**Pathotyp 0**	**Raza 0**		
		absent	absente	fehlend	ausente	Charentais T, Jaune Canari 2	1
		present	présente	vorhanden	presente	Charentais Fom-2, Jador, Védrantais,	9
		----------	----------	----------	----------	----------	-------
69.2 (*)		**Race 1**	**Race 1**	**Pathotyp 1**	**Raza 1**		
		absent	absente	fehlend	ausente	Charentais T, Jaune Canari 2, Védrantais	1
		present	présente	vorhanden	presente	Arapaho, Charentais Fom-2, Jador, Rubbens	9
		----------	----------	----------	----------	----------	-------
69.3 (*)		**Race 2**	**Race 2**	**Pathotyp 2**	**Raza 2**		
		absent	absente	fehlend	ausente	Arapaho, Charentais Fom-2, Charentais T, Jaune Canari 2, Rubbens	1
		present	présente	vorhanden	presente	Anasta, Cléo, Jador, Védrantais,	9
		----------	----------	----------	----------	----------	-------
69.4 **(+)**		**Race 1-2**	**Race 1-2**	**Pathotyp 1-2**	**Raza 1-2**		
		absent	absente	fehlend	ausente	Jaune Canari 2, Védrantais, Virgos	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Lunasol	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Dinéro, Isabelle	3

Current wording:

70. **(+)** **QN**	**VG**	**Resistance to *Sphaerotheca fuliginea (Podosphaera xanthii)* (Powdery mildew)**	**Résistance à *Sphaerotheca fuliginea (Podosphaera xanthii)* (oïdium)**	**Resistenz gegen *Sphaerotheca fuliginea (Podosphaera xanthii* (Echter Mehltau)**	**Resistencia a *Sphaerotheca fuliginea (Podosphaera xanthii)* (Oidio)**		
		---	---	---	---	---	---
70.1		**Race 1**	**Pathotype 1**	**Pathotyp 1**	**Raza 1**		
		susceptible	sensible	anfällig	susceptible	Alpha, Boneto, Delta, Jerac	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Escrito	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Cézanne, Anasta, Théo	3
		---	---	---	---	---	---
70.2		**Race 2**	**Pathotype 2**	**Pathotyp 2**	**Raza 2**		
		susceptible	sensible	anfällig	susceptible	Boneto, Galoubet	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Flores, Enzo, Escrito	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Anasta, Cézanne, Théo	3
70.3		---	---	---	---	---	---
		Race 5	**Pathotype 5**	**Pathotyp 5**	**Raza 5**		
		susceptible	sensible	anfällig	susceptible	Védrantais	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Enzo, Flores	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Gaetano, Lucas, Théo	3

Proposed new wording:

70. **(+)** **QN**	**VG**	**Resistance to *Podosphaera xanthii (Sphaerotheca fuliginea)* (Powdery mildew)**	**Résistance à *Podosphaera xanthii (Sphaerotheca fuliginea)* (oïdium)**	**Resistenz gegen *Podosphaera xanthii (Sphaerotheca fuliginea)* (Echter Mehltau)**	**Resistencia a *Podosphaera xanthii (Sphaerotheca fuliginea)* (Oidio)**		
		---	---	---	---	---	---
70.1		**Race 1**	**Race 1**	**Pathotyp 1**	**Raza 1**		
		susceptible	sensible	anfällig	susceptible	Jaune Canari 2, Védrantais	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Escrito	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Anasta,Cézanne, PMR45, PMR5, Edisto47	3
		---	---	---	---	---	---
70.2		**Race 2**	**Race 2**	**Pathotyp 2**	**Raza 2**		
		susceptible	sensible	anfällig	susceptible	Galoubet, PMR45, Védrantais	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Escrito, Pendragon	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Anasta, Cézanne, Edisto47, PMR45	3
		---	---	---	---	---	---
NEW (FR-1) 70.**		**Race 3**	**Race 3**	**Pathotyp 3**	**Raza 3**		
		susceptible	sensible	anfällig	susceptible	PMR5, PMR45, Védrantais	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Nettuno, WMR29	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Batista, Edisto47, Godiva	3
		---	---	---	---	---	---
70.3		**Race 5**	**Race 5**	**Pathotyp 5**	**Raza 5**		
		susceptible	sensible	anfällig	susceptible	Védrantais, Edisto47	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Hugo, Pendragon	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Arapaho, PMR5	3
		---	---	---	---	---	---
NEW (NL-1) 70.**		**Race 3-5**	**Race 3-5**	**Pathotyp 3-5**	**Raza 3-5**		
		susceptible	sensible	anfällig	susceptible	Edisto47, PMR5, Védrantais	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Cisco	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	SVI0105, 90625	3

Current wording:

71. **(+)**	**VG**	**Resistance to *Erysiphe cichoracearum (Golovinomyces cichoracearum)* Race 1 (Powdery mildew)**	**Résistance à *Erysiphe cichoracearum (Golovinomyces cichoracearum)* Pathotype 1 (oïdium)**	**Resistenz gegen *Erysiphe cichoracearum (Golovinomyces cichoracearum)* Pathotyp 1 (Echter Mehltau)**	**Resistencia a *Erysiphe cichoracearum (Golovinomyces cichoracearum)* Raza 1 (Oidio)**		
QN		susceptible	sensible	anfällig	susceptible	Bastion, Boneto	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Flores, Anasta	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Cézanne, Heliobel, Théo	3

Proposed new wording:

71. **(+)**	**VG**	**Resistance to *Golovinomyces cichoracearum (Erysiphe cichoracearum)* Race 1 (Powdery mildew)**	**Résistance à *Golovinomyces cichoracearum (Erysiphe cichoracearum)* Race 1 (oïdium)**	**Resistenz gegen *Golovinomyces cichoracearum (Erysiphe cichoracearum* Pathotyp 1 (Echter Mehltau)**	**Resistencia a *Golovinomyces cichoracearum (Erysiphe cichoracearum)* Raza 1 (Oidio)**		
QN		susceptible	sensible	anfällig	susceptible	Edisto47, Escrito, Score, Védrantais	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Anasta	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Heliobel, PMR45, 90625	3

Current wording:

72. **(+)**	**VG**	**Resistance to colonization by *Aphis gossypii***	**Résistance à la colonisation par *Aphis gossypii***	**Resistenz gegen Befall durch *Aphis gossypii***	**Resistencia a la colonización por *Aphis gossypii***		
QL		absent	absente	fehlend	ausente	Charentais	1
		present	présente	vorhanden	presente	AR, Margot, Top Mark	9

Proposed new wording:

72. **(+)**	**VG**	**Resistance to colonization by *Aphis gossypii***	**Résistance à la colonisation par *Aphis gossypii***	**Resistenz gegen Befall durch *Aphis gossypii***	**Resistencia a la colonización por *Aphis gossypii***		
QL		absent	absente	fehlend	ausente	Védrantais	1
		present	présente	vorhanden	presente	AR Hale's Best Jumbo, AR Top Mark, Godiva, Heliobel, Virgos	9

Current wording:

73. **(+)**	**VG**	**Resistance to Zucchini Yellow Mosaic Virus (ZYMV) Race F**	**Résistance au virus de la mosaïque jaune de la courgette (ZYMV) Pathotype F**	**Resistenz gegen Zucchinigelb-mosaikvirus (ZYMV), Pathotyp F**	**Resistencia al virus del mosaico amarillo del calabacín (ZYMV) Raza F**		
QL		absent	absente	fehlend	ausente	Alpha, Boule d'Or, Cantor, Doublon	1
		present	présente	vorhanden	presente	Eloro, Hermes, Védrantais	9

Proposed new wording:

73. **(+)**	**VG**	**Resistance to *Zucchini yellow mosaic virus* (ZYMV)**					
		If use of a F type strain (ie: strain 13.18Fn)					
QL		Susceptibility reaction: **mosaic**				Védrantais	1-a
		Systemic hypersusceptibility: **slow flacida necrosis**				~~Cantor~~	1-b
		Systemic hypersusceptibility: **fast flacida necrosis**				~~Doublon~~, Galoubet, Génésis, Helios	1-c
		Localised hypersusceptibility: **local necrosis**				Lunaduke, PI414723, Polinyka	9
		If use of a NF type strain (ie: strain E15)					
QL		Susceptibility reaction: **mosaic**				Galoubet, Génésis, Helios, Védrantais	1
		Localised hypersusceptibility: **local necrosis**				Lunaduke, PI414723, Polinyka	9

Current wording:

74. **(+)**	**VG**	**Resistance to Papaya Ring Spot Virus (PRSV)**	**Résistance au virus des taches annulaires du papayer**	**Resistenz gegen Papayaringflecken-virus (PRSV)**	**Resistencia al virus de la mancha anular del papayo (PRSV)**		
QL		---	---	---	---	---	---
74.1		**Race GVA**	**Pathotype GVA**	**Pathotyp GVA**	**Raza GVA**		
		absent	absente	fehlend	ausente	Védrantais	1
		present	présente	vorhanden	presente	WMRV 29, 72025	9
		---	---	---	---	---	---
74.2		**Race E2**	**Pathotype E2**	**Pathotyp E2**	**Raza E2**		
		absent	absente	fehlend	ausente	Védrantais, 72025	1
		present	présente	vorhanden	presente	WMRV 29	9

Proposed new wording:

74. **(+)**	**VG**	**Resistance to *Papaya ringspot virus* (PRSV)**	**Résistance au virus des taches annulaires du papayer**	**Resistenz gegen Papayaringflecken-virus (PRSV)**	**Resistencia al virus de la mancha anular del papayo (PRSV)**		
		---	---	---	---	---	---
74.1		**Guadeloupe strain**	**Souche Guadeloupe**	**Pathotyp Guadeloupe**	**Cepa Guadeloupe**		
QL		absent	absente	fehlend	ausente	Védrantais	1
		present	présente	vorhanden	presente	PI414723, WMR29, 72.025,	9
		---	---	---	---	---	---
74.2		**E2 strain**	**Souche E2**	**Pathotyp E2**	**Cepa E2**		
QL		absent	absente	fehlend	ausente	PI414723, Védrantais, 72.025,	1
		present	présente	vorhanden	presente	WMR29	9

Current wording:

75. **(+)**	**VG**	**Resistance to Muskmelon Necrotic Spot Virus (MNSV) Race E_8**	**Résistance au virus de la criblure du melon (MNSV) Pathotype E_8**	**Resistenz gegen Netzmelonen-nekrosefleckenvirus (MNSV), Pathotyp E_8**	**Resistencia al virus del cribado del melón (MNSV) Raza E_8**		
QL		absent	absente	fehlend	ausente	Védrantais	1
		present	présente	vorhanden	presente	Primal, VA 435	9

Proposed new wording:

75. **(+)**	**VG**	**Resistance to *Melon necrotic spot virus* (MNSV) E8 strain**	**Résistance au virus de la criblure du melon (MNSV) Souche E8**	**Resistenz gegen Netzmelonen-nekrosefleckenvirus (MNSV) Pathotyp E8**	**Resistencia al virus del cribado del melón (MNSV) Raza E8**		
QL		absent	absente	fehlend	ausente	Védrantais	1
		present	présente	vorhanden	presente	Cyro, PMR5, Primal, VA 435, Yellow Fun, Virgos	9

Current wording:

76. **(+)**	**VG**	**Resistance to Cucumber Mosaic Virus (CMV)**	**Résistance au virus de la mosaïque du concombre (CMV)**	**Resistenz gegen Gurkenmosaikvirus (CMV)**	**Resistencia al virus del mosaico del pepino (CMV)**		
QL		absent	absente	fehlend	ausente	Cézanne, Dalton	1
		present	présente	vorhanden	presente	Lunaduke	9

Proposed new wording:

76. **(+)**	**VG**	**Resistance to *Cucumber mosaic virus* (CMV)**	**Résistance au virus de la mosaïque du concombre (CMV)**	**Resistenz gegen Gurkenmosaikvirus (CMV)**	**Resistencia al virus del mosaico del pepino (CMV)**		
QL		absent	absente	fehlend	ausente	Védrantais	1
		present	présente	vorhanden	presente	Virgos, PI61375, Lunaduke	9

Proposal to Include a Revised Format for Disease Resistance Characteristics

Please see next page, current and proposed new wording are presented on opposite pages.

Proposal to Include a Revised Format for Disease Resistance Characteristics
(Current and Proposed New Wording are presented on opposite pages)

Current wording:

Ads. 69.1 - 69.3: Resistance to *Fusarium oxysporum* f. sp. *melonis,* races 0, 1 and 2

Maintenance of races

Type of medium:	on agar medium at 22 to 25°C
Special conditions:	transplantation of races each month

Execution of test

Growth stage of plants:	cotyledons expanded
Temperature:	24°C during day, 18°C during night
Light:	10 - 12 hours per day
Growing method:	Petri dishes in climatic chambers
Method of inoculation:	soaking of the root system in a suspension of liquid medium of fungus
Duration of test	
- from sowing to inoculation:	10-15 days
- from inoculation to reading:	20 days, death of susceptible plants
Number of plants tested:	30 plants
Remarks:	plants raised and transplanted in sterilized sand, irrigation with nutrient solution

Proposed new wording:

Ads. 69.1 - 69.3: Resistance to *Fusarium oxysporum* f. sp. *melonis,* races 0, 1 and 2 **(Fom)**

1. Pathogen..... *Fusarium oxysporum* f. sp. *melonis*
2. Quarantine status..... no
3. Host species ..... *Cucumis melo*
4. Source of inoculum ..... GEVES (FR), Naktuinbouw (NL)
5. Isolate ..... Fom: 0, Fom: 1, Fom: 2
6. Establishment isolate identity..... use differential varieties: Charentais T, Védrantais, Charentais -Fom 2, (Isabelle, Jador)
7. Establishment pathogenicity ..... use susceptible melon varieties
8. Multiplication inoculum
8.1 Multiplication medium ..... on agar medium – e.g.Potato Dextrose Agar
8.2 Multiplication variety
8.3 Plant stage at inoculation
8.4 Inoculation medium..... on liquid medium
8.5 Inoculation method
8.6 Harvest of inoculum
8.7 Check of harvested inoculum
8.8 Shelflife/viability inoculum
9. Format of the test
9.1 Number of plants per genotype..... at least 20
9.2 Number of replicates
9.3 Control varieties

Varieties	Gene	Race 0	Race 1	Race 2
Charentais T		S	S	S
Védrantais	*Fom-1*	R	S	R
Charentais Fom-2	*Fom-2*	R	R	S
(Isabelle, Jador)		R	R	R

9.4 Test design
9.5 Test facility..... glasshouse or climatic room
9.6 Temperature ..... 18-25°C
9.7 Light 12h
9.8 Season..... all seasons
9.9 Special measures ..... Optional: shading (no direct sunlight during 12 h after inoculation
10. Inoculation
10.1 Preparation inoculum ..... aerated culture 7-10 days, eg. Czapek Dox broth
some isolates need filtration or centrifugation
resuspend the pelleted spores in demineralized water
10.2 Quantification inoculum..... spore count; adjust to 10^6 -10^7 per mL
10.3 Plant stage at inoculation..... cotyledon expanded
10.4 Inoculation method..... soaking of the root system in a suspension of liquid medium of fungus
At least 30sec - 5 min
10.5 First observation ..... 7 dpi
10.6 Second observation ..... 14 -20 dpi
*10.7 Final observations ..... 20 dpi
11. Observations
11.1 Method ..... visual, comparative
11.2 Observation scale
[1] Susceptible ..... Growth retardation in combination with yellowing or wilting cotyledons (useful for judging the severity of the attack), Optional: internal vessel browning, death of plant.
[9] Resistant..... No symptoms
11.3 Validation of test ..... on standards
11.4 Off-types .....
12. Interpretation of data in terms of UPOV characteristic states ..... QL
13. Critical control points..... For Race 1.2 the modified protocol on the next page should be used

Current wording:

Ad. 69.4: Resistance to *Fusarium oxysporum* f. sp. *melonis,* race 1-2

Maintenance of races

Type of medium:	on agar medium at 22 to 25°C
Special conditions:	transplantation of races each month

Execution of test

Growth stage of plants:	cotyledons expanded
Temperature:	24°C during day, 18°C during night
Light:	12 hours per day
Growing method:	dishes in climatic chambers
Method of inoculation:	absorption of 700 ml of a very diluted (30 to 50 times) fungus culture
Duration of test	
- from sowing to inoculation:	10 to 15 days
- from inoculation to reading:	3 weeks, until the death of the susceptible control
Number of plants tested:	30 plants
Remarks:	a moderately aggressive type of race 1-2 should be used as this is likely to show the difference between the presence and absence of resistance most clearly.

Proposed new wording:

Ad. 69.4: Resistance to *Fusarium oxysporum* f. sp. *melonis,* race 1-2 **(Fom)**

1. Pathogen	*Fusarium oxysporum* f. sp. *melonis*
2. Quarantine status	no
3. Host species	*Cucumis melo*
4. Source of inoculum	GEVES (FR), Naktuinbouw (NL)
5. Isolate	Fom: 1.2 (moderately aggressive): TST strain
6. Establishment isolate identity	use differential varieties: susceptible:Védrantais, Virgos, moderately resistant : Lunasol, highly resistant Isabelle, Dinéro
7. Establishment pathogenicity	use susceptible melon varieties
8. Multiplication inoculum	
8.1 Multiplication medium	on agar medium e.g. Potato Dextrose Agar
8.2 Multiplication variety	
8.3 Plant stage at inoculation	
8.4 Inoculation medium	on liquid medium
8.5 Inoculation method	
8.6 Harvest of inoculum	
8.7 Check of harvested inoculum	
8.8 Shelflife/viability inoculum	
9. Format of the test	
9.1 Number of plants per genotype	at least 30 Remarks: It is a quantitative trait: necessity of replications, a sufficiently large number of plants to allow the use of a statistical analysis to determine if the level of resistance is significantly different or not from Lunasol.
9.2 Number of replicates	
9.3 Control varieties	
[1] susceptible	Virgos, Védrantais
[2] moderately resistant	Lunasol (the lowest accepted level)
[3] highly resistant	Isabelle, Dinéro, Jador
9.4 Test design	
9.5 Test facility	glasshouse or climatic room
9.6 Temperature	18-25°C
9.7 Light	at least 12h
9.8 Season	All seasons in a climatic room / in a greenhouse: be aware of the strong environmental effect: winter could be too severe and summer could be too mild.
9.9 Special measures	Optional shading (no direct sunlight during 12 h after inoculation)
10. Inoculation	
10.1 Preparation inoculum	aerated culture 7-10 d old – e.g.: Czapek Dox broth
10.2 Quantification inoculum	spore count; adjust to 2.10^4 - 10^5 per ml
10.3 Plant stage at inoculation	cotyledons expanded
10.4 Inoculation method	Soaking of the trays in spore suspension; 700 ml for a tray with 25 - 30 plants, plants are not uprooted
10.5 First observation	7 - 14 dpi
10.6 Second observation	14 - 21 dpi
*10.7 Final observations	21- 28 dpi
11. Observations	
11.1 Method	Visual, comparative
11.2 Observation scale	Symptoms:
[1] susceptible	Védrantais: Growth retardation, yellow cotyledons, drying, internal vessel browning (optional), death of the plant
[2] moderately resistant	Symptoms may be present, but the level of expression must be distinctly lower than the susceptible control variety. = the lowest level of resistance is defined by the behavior of Lunasol
[3] highly resistant	Symptoms may be present, but the level of expression must be distinctly lower (interest of replication / statistical analysis) than the moderately control variety Lunasol.
11.3 Validation of test	on standards; Lunasol is intermediate and will show a percentage of diseased plants (quantitative evaluation)
11.4 Off-types	Calibrate with Lunasol
12. Interpretation of data in terms of UPOV characteristic states	QN
13. Critical control points	a moderately aggressive type of Fom: 1.2 should be used as this is likely to show the difference between the presence and absence of resistance most clearly There are two types of *Fusarium oxysporum* f. sp. *melonis,* Fom:1.2, viz. Fom: 1.2y which is a yellowing type with yellowing symptoms on leaves and another type and Fom: 1.2w which is a wilt type with wilting symptoms on leaves.

Current wording:

Ads. 70.1 to 70.3: Resistance to *Sphaerotheca fuliginea (Podosphaera xanthii),* races 1, 2 and 5
Ad. 71: Resistance to *Erysiphe cichoracearum (Golovinomyces cichoracearum),* race 1

1. Inoculum

Production of cotyledons

Cotyledons to be inoculated and tested: sow the seed in disinfected peat inside a closed mini glasshouse. When the cotyledons have expanded, remove them from the plant.

Desinfect the cotyledons by soaking them for 3 minutes in a mercuric chloride solution (0.05%). Rinse them twice with sterilized water. Dry the cotyledons with sterile paper towel, then place them in Petri dishes with the following medium:

sucrose	10 g
mannitol	20 g
agar	5 g
distilled water	1 liter

Propagation of the strains

Scatter conidia on the cotyledons and blow them. Incube the inoculated cotyledons in Petri dishes at 23°C during 14 hours in the light and at 18°C during 10 hours in the dark.

9 to 11 days after the inoculation, the cotyledons will be covered with spores and can be used as an inoculum.

Maintenance of races

Type of medium: on inoculated cotyledons

Special conditions: 17°C, under very low light intensity. Maximum storage time is 1 to 1.5 months, after the inoculation.

2. Execution of Test

Inoculation on leaf disks (to be used as routine method)

Leaf disks, 2 cm in diameter, are taken from young plants and placed in polystyrene boxes (180 x 125 mm, 54 leaf disks per box) on a medium (mannitol 40g/l, benzamidazole 30 mg/l, agar 4 g/l). The leaf disks are inoculated by placing the boxes at the base of an inoculation tower (height: 1.00 m, diameter 0.25 m).

A cotyledon, already covered with inoculum, is placed on the top of the tower and blown with a Pasteur pipette to detach spores. Wait 1 to 2 minutes so that the conidia fall down through the tower onto the leaf discs. The leaf disks are kept for 24 hours in the dark by covering the boxes with a black polyethylene sheet. The boxes are then placed in a climatised chamber (20°C in the light for 14 hours; 24°C in the dark, for 10 hours per day).

Duration of test/Number of plants

- from inoculation to reading: 10 days
- number of plants tested: 5

Scoring

Strongly resistant varieties (Note 3)
0 no development of the fungi
1 isolated colonies (less than 10% of the disk surface)
Moderately resistant varieties (especially for *Erysiphe cichoracearum (Golovinomyces cichoracearum)) (Note 2)*
2 isolated colonies (more than 10 % of the disk surface)
3 all the disk surface is covered with weak sporulation
Susceptible varieties (Note 1)
4 sporulation on all the disk surface
5 intense sporulation

Inoculation on young plants (to be used as a complementary method to the disk method, if necessary)

Take spores from a cotyledon already covered with conidia and deposit them on a leaf taken from a young plant. You can also proceed by blowing the spores from a cotyledon by the method mentioned above.

Scoring

Strongly resistant varieties (Note 3)
0 no development of the fungi
1 isolated colonies (less than 10% of the leaves)
Moderately resistant varieties (especially for *Erysiphe cichoracearum (Golovinomyces cichoracearum)) (Note 2)*
3 isolated colonies (more than 10% of the leaves)
5 weak sporulation
Susceptible varieties (Note 1)
7 medium sporulation
9 intense sporulation

3. Host differentials

	***Sphaerotheca fuliginea* (*Podosphaera xanthii*)**					***Erysiphe cichoracearum* (*Golovinomyces cichoracearum*)**	
	race 0	**race 1**	**race 2**	**race 4**	**race 5**	**race 0**	**race 1**
Iran H	S	S	S	S	S	S	S
Védrantais	R	S	S	S	S	R	S
PMR 45	R	R	S	S	S	R	S
WMR 29	R	R	R	S	S	R	S
Edisto 47	R	R	R	R	S	R	R
MR-1, PI 124112	R	R	R	R	R	R	R
PMR 5							
Nantais Oblong	R	S	S	S	S	R	R

S: susceptible (high sporulation) R: resistant (low sporulation)

Proposed new wording:

Ads. 70.1 to 70.3: Resistance to *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Powdery mildew) Px (Sf)
Ad. 71: Resistance to *Golovinomyces cichoracearum (Erysiphe cichoracearum),* race 1 (Powdery mildew) Gc (Ec)

1. Pathogen ..... Powdery mildew**:** *Podosphaera xanthii* (*Spaerotheca fuliginea*) races 1, 2 and 5
Golovinomyces cichoRacearum (*Erysiphe cichoracearum*) race 1
2. Quarantine status ..... no
3. Host species ..... *Cucumis melo*
4. Source of inoculum ..... GEVES (FR)
5. Isolate ..... Px : races 1, 2, 3, 5 and 3-5; Gc : race 1
6. Establishment isolate identity ..... on differentials:

	Powdery Mildew								
	***Podosphaera xanthii* (*Sphaerotheca fuliginea*)**							***Golovinomyces cichoracearum (Erysiphe cichoracearum)***	
	race 0	**race 1**	**race 2**	~~**race 4**~~	**race 3**	**race 5**	**race 3-5**	**race 0**	**race 1**
~~Iran H~~	~~S~~	~~S~~	~~S~~	~~S~~		~~S~~		~~S~~	~~S~~
Védrantais	R	S	S	~~S~~	S	S	S	R	S
Nantais Oblong	R	S	S	~~S~~	S	S	S	R	**R**
PMR 45	R	**R**	S	~~S~~	S	S	S	R	S
WMR 29	R	**R**	**R**	~~S~~	**R**	S	S	R	S
Edisto 47	R	**R**	**R**	~~R~~	**R**	S	S	R	S
PI 124112	R	**R**	**R**	~~R~~	**R**	**R**	**R**	R	**R**
PMR 5	R	**R**	**R**	~~R~~	S	**R**	S	R	**R**
AR Hale's Best Jumbo							**R**		

Legend: S susceptible (high sporulation); ,R resistant (low sporulation)

7. Establishment pathogenicity ..... use susceptible melon varieties
8. Multiplication inoculum
8.1 Multiplication medium ..... Detached cotyledon in Petri-dish on 0.35 - 0,5 % Agar, 1-2% mannitol, optional: 1% sucrose
8.2 Multiplication variety ..... susceptible varieties
8.3 Plant stage at inoculation ..... Young, unfolded cotyledon; decontaminated with e.g. 0,05% mercuric chloride or 3 à 5%.bleach (NaClO + NaCl)
8.4 Inoculation medium..... Air
8.5 Inoculation method ..... Scatter conidia on the cotyledons transferred by blowing
8.6 Harvest of inoculum ..... use cotyledons with strong sporulation
8.7 Check of harvested inoculum ..... check presence of spores
8.8 Shelflife/viability inoculum..... on cotyledon, 17-23°C, under very low light intensity. Maximum storage time is 15 days, after the inoculation
Remark: In case of longer term preservation, inoculate locally with a few spores, store at 14°C/12h low light per day
9. Format of the test
9.1 Number of plants per genotype ..... at least 16 plants
9.2 Number of replicates
9.3 Control varieties..... Host differentials: table given in paragraph 6
9.4 Test design ..... Leaf discs placed on 0,4% agar with 1- 4% mannitol and (optional) 0,003% benzimidazol
9.5 Test facility..... climatic room
9.6 Temperature ..... 20-24°C
9.7 Light ..... Optional 24 h darkness after inoculation - at least 12h
9.8 Season
9.9 Special measures ..... Inoculation tower needed for even distribution of dry spores

10. Inoculation	
10.1 Preparation inoculum	
10.2 Quantification inoculum	
10.3 Plant stage at inoculation	Routine method: Leaf disks, 2 cm in diameter, from young plants. Complementary method, if necessary: young plants
10.4 Inoculation method	Routine method: on leaf disks: inoculation tower needed for even distribution of dry spores. Complementary method: Take spores from a cotyledon covered with conidia and deposit them on a leaf or blow the spores from a cotyledon.
10.5 First observation	8-10 dpi
10.6 Second observation	
*10.7 Final observations	11-12 dpi
11. Observations	
11.1 Method	visual
11.2 Observation scale	
[1] susceptible	Medium or intense sporulation all over the leaf disc surface
[2] intermediate	Weak sporulation all over the surface or isolated colonies on more than 10 % of the surface
[3] resistant	Isolated colonies on less than 10 % of the surface or no sporulation
11.3 Validation of test	on controls
11.4 Off-types	
12. Interpretation of data in terms of UPOV characteristic states	QN
13. Critical control points	

Current wording:

Ad. 72: Resistance to colonization by *Aphis gossypii*

Maintenance of strain

Maintenance and multiplication:	on susceptible variety (Védrantais)
Special conditions:	low aphid density to avoid having too many winged types. "Synchronous"-type breeding in order to have only aphids of the same age and, therefore, at the same growing stage on a plant

Conduct of the test

Plant stage:	1st leaf measuring 2-3 cm
Temperature:	21°C
Light:	16 hours per day
Planting:	plants sown in sand, pricked out at cotyledon stage in compost-filled pots
Manner of inoculation:	deposit of ten adult wingless aphid per plant
Duration of test:	
- from sowing to inoculation:	15-18 days
- from inoculation to reading:	one day
Number of plants tested:	30
Recording:	- Resistance present = less than 7 adult aphids per plant; eggs rare. - Resistance absent = 9 or 10 adult aphids per plant; eggs frequent. - Record number of aphids per plant, 24 hours after inoculation.

Proposed new wording:

Ad. 72: Resistance to colonization by *Aphis gossypii*

1. Pathogen	*Aphis gossypii*
2. Quarantine status	no
3. Host species	*Cucumis melo*
4. Source of inoculum	INRA GAFL (FR)
5. Isolate	NM1 clone
6. Establishment isolate identity	
7. Establishment pathogenicity	on susceptible plants
8. Multiplication inoculum	
8.1 Multiplication medium	living plant (obligate parasite), e.g. young plants of Melon or Cucumber
8.2 Multiplication variety	on susceptible variety (Védrantais, Corona, Ventura)
8.3 Plant stage at inoculation	at first leaf (measuring around 2-3 cm)
8.4 Inoculation medium	
8.5 Inoculation method	deposit ten adult wingless aphids per plant or a piece of infested leaf (visual appreciation)
8.6 Harvest of inoculum	
8.7 Check of harvested inoculum	
8.8 Shelflife/viability inoculum	
9. Format of the test	
9.1 Number of plants per genotype	30
9.2 Number of replicates	
9.3 Control varieties	
[1] susceptible	Védrantais
[9] resistant.....	AR Top Mark, AR Hale's Best Jumbo, Virgos
9.4 Test design	
9.5 Test facility	
9.6 Temperature	21-24°C day/16-20°C night
9.7 Light	16 hours per day
9.8 Season	
9.9 Special measures	
10. Inoculation	
10.1 Preparation inoculum.....	
10.2 Quantification inoculum	optional: 10 adult wingless aphid per plant
10.3 Plant stage at inoculation	1st leaf measuring around 2-3 cm
10.4 Inoculation method	optional: deposit of ten adult wingless aphids per plant or by deposit of a piece of infested leaf
10.5 First observation	1-4 dpi
*10.6 Final observation	5- 10 dpi
11. Observations	
11.1 Method	visual, to compare with standards
11.2 Observation scale	
[1] susceptible: Védrantais	9 or 10 adult aphids per plant; larvae frequent, plants covered with aphids, shriveled leaves
[9] resistant: AR Top Mark, AR Hale's Best Jumbo Virgos	less than 7 adult aphids per plant; larvae rare. Remark: counting is not compulsory, it can be a visual assessment of the respective level of colonization.
11.3 Validation of test	on standards
11.4 Off-types	
12. Interpretation of data in terms of UPOV characteristic states	QL
13. Critical control points	low aphid density to avoid having too many winged types. "Synchronous"-type breeding in order to have only aphids of the same age and, therefore, at the same growing stage on a plant. Normally *Aphis gossypii* is viviparous, but sometimes (autumn, on particular crops) may produce eggs.

Current wording:

Ad. 73: Resistance to Zucchini Yellow Mosaic Virus (ZYMV), race F

A. INOCULUM

Maintenance of strain

Maintenance:	5°C and kept dry using anhydrous calcium chloride
Special conditions:	pre-multiplication of the virus on non-wilting variety (Védrantais) prior to testing

B. INOCULATION AND INCUBATION

Conduct of the test

Plant stage:	1st emergent leaf
Temperature:	25°C during day, 18°C during night
Light:	12 hours per day
Manner of inoculation:	mechanical inoculation by rubbing of cotyledons with inoculum
Duration of test:	
- from sowing to inoculation:	15 days
- from inoculation to reading:	15 days
Number of plants tested:	30

C. SYMPTOMS AND OBSERVATIONS

Reading difficulty:	- heterozygotes (Fn/Fn+) wither and die more slowly than homozygotes (Fn/Fn) - use the F pathotype of ZYMV
Example varieties:	
Védrantais (Fn+/Fn+):	mosaic (resistance present)
Cantor (Fn/Fn+):	slower necrosis with wilting (resistance absent)
Doublon (Fn/Fn):	necrosis with wilting (resistance absent)

Proposed new wording:

Ad. 73: Resistance to *Zucchini yellow mosaic virus* (ZYMV), F strain

1. Pathogen	*Zucchini yellow mosaic virus* (ZYMV)
2. Quarantine status	no
3. Host species	*Cucumis melo*
4. Source of inoculum	GEVES (FR)
5. Isolate	strain F (e.g. strain 13-18Fn)

Remark: interest to work with a strain F (ie: strain 13-18Fn), rather than a strain NF (ie: train E15)
The resistance to ZYMV is given by the presence of the gene Zym. This gene is epistatic on the gene Fn. So, the status of the gene Fn is only reachable when the gene Zym is absent (Zym^+). In this case, 3 "no resistant" phenotypes can be observed:

- ..... Zym^+;Fn^+/Fn^+ ("true" susceptible phenotype) : mosaic non wilting
- ..... Zym^+; Fn/Fn^+ (systemic hypersensibility reaction, heterogysous Fn / Fn+): slow flacida necrosis Zym^+; Fn/Fn (systemic hypersensibility reaction, homozygous Fn / Fn): fast flacida necrosis wilting (flacida necrosis)

6. Establishment isolate identity	use standard varieties, flaccida necrosis on Génésis (Zym^+ / Fn)
7. Establishment pathogenicity	on susceptible melon varieties - As above
8. Multiplication inoculum	
8.1 Multiplication medium	
8.2 Multiplication variety	Védrantais (Zym^+; Fn^+/Fn^+) (non-wilting)
8.3 Plant stage at inoculation	First leaf appearing
8.4 Inoculation medium	Fresh and dried leaves homogenized, in PBS with carborundum
8.5 Inoculation method	rubbing
8.6 Harvest of inoculum	on symptomatic leaves
8.7 Check of harvested inoculum	
8.8 Shelflife/viability inoculum	
9. Format of the test	
9.1 Number of plants per genotype	at least 30
9.2 Number of replicates	
9.3 Control varieties	Védrantais (Zym^+ ; Fn^+/Fn^+) (susceptible) ; ~~Doublon,~~ Génésis (Zym+; Fn/Fn), ~~Cantor~~ , *** (Zym+; Fn+/Fn) ; PI414723, Lunadule, Polinyka(Zym) (resistant)
9.4 Test design	
9.5 Test facility	growth chamber
9.6 Temperature	22°C - 25°C during day and 18°C during night
9.7 Light	12 hours
9.8 Season	all seasons
9.9 Special measures	
10. Inoculation	
10.1 Preparation inoculum	ice cold buffer solution: Fresh leaves homogenized in PBS and carborundum
10.2 Quantification inoculum	
10.3 Plant stage at inoculation	cotyledon expanded or first emergent leaf
10.4 Inoculation method	mechanical inoculation by rubbing of cotyledons with inoculum
10.5 First observation	
10.6 Final observation	14-15 dpi
11. Observations	
11.1 Method	visual, comparative
11.2 Observation scale	
[1] susceptible: ~~Doublon,~~Génésis (Fn/Fn; Zym^+)	necrosis with fast wilting
[1] susceptible: ~~Cantor~~) (Fn/Fn^+; Zym^+)	lower necrosis with wilting - Slow wilting and necrosis
[1] susceptible: Védrantais, (Fn^+/Fn^+; Zym^+)	mosaic, non-wilting
[9] resistant: PI 414723 (Zym)	no symptoms
11.3 Validation of test	on Standards
11.4 Off-types	
12. Interpretation of data in terms of UPOV characteristic states	
13. Critical control points	heterozygous (Fn/Fn+) wither and die more slowly than homozygotes (Fn/Fn) use the pathotype F of ZYMV The gene Zym is épistatic on the gene Fn: The gene Fn and the gene Vat are linked in repulsion.

Current wording:

Ad. 74: Resistance to Papaya Ring Spot Virus (PRSV), race GVA and race E2

A. INOCULUM

Maintenance of strain

Maintenance:	5°C and kept dry using anhydrous calcium chloride
Special conditions:	pre-multiplication of the virus on susceptible variety (Védrantais) prior to testing

B. INOCULATION AND INCUBATION

Conduct of the test

Plant stage:	1st emergent leaf
Temperature:	25°C during day, 18°C during night
Light:	12 hours per day
Manner of inoculation:	mechanical inoculation by rubbing cotyledons with inoculum
Duration of test:	
- from sowing to inoculation:	15 days
- from inoculation to reading:	15-20 days
Number of plants tested:	30

C. SYMPTOMS AND OBSERVATIONS

Identification of two strains of the PRSV virus and of the two alleles concerned:

Genotypes/Strains	GVA strain	E2 strain
Védrantais ($Prsv^+$)	Mosaic (vein-clearing) = resistance absent	Mosaic (vein-clearing) = resistance absent
72025 ($Prsv^2$)	- No systemic symptoms - Local necrotic lesions on cotyledons (irregular) = resistance present	- Apical necrosis = Necrosis of plant instead of local lesions: resistance absent
WMRV 29 ($Prsv^1$)	- No systemic symptoms - Occasional local necrotic lesions on cotyledons = resistance present	- No systemic symptoms - Occasional local necrotic lesions on cotyledons = resistance present

Proposed new wording:

Ad. 74: Resistance to *Papaya ringspot virus* (PRSV), Guadeloupe strain and E2 strain

1. Pathogen ..... *Papaya ringspot virus* (PRSV)
2. Quarantine status ..... No
3. Host species ..... *Cucumis melo*
4. Source of inoculum
5. Isolate ..... Guadeloupe strain and E2 strain
6. Establishment isolate identity

For Guadeloupe strain:		
[1] Susceptible: Védrantais	(Prv^+)	Mosaic (vein-clearing)
[9] Resistant: 72.025, PI414723,	(Prv^2)	- No systemic symptoms - Irregular local necrotic lesions on cotyledons
[9] Resistant: WMR29	(Prv^1)	No systemic symptoms Occasional local necrotic lesions on cotyledons

For E2 strain:		
[1] Susceptible: Védrantais	(Prv^+)	Mosaic (vein-clearing)
[1] Susceptible: 72.025, PI414723,	(Prv^2)	-Apical necrosis - Necrosis of plant instead of local lesions
[9] Resistant: WMR29	(Prv^1)	- No systemic symptoms or few systemic chloronecrotic symptoms - Occasional local necrotic lesions on cotyledons

7. Establishment pathogenicity
8. Multiplication inoculum
8.1 Multiplication medium
8.2 Multiplication variety ..... pre-multiplication of the virus on non-wilting variety (Védrantais) prior to testing
8.3 Plant stage at inoculation ..... First leaf appearing
8.4 Inoculation medium..... PBS with carborundum
8.5 Inoculation method ..... rubbing
8.6 Harvest of inoculum ..... Fresh or dried leaves homogenized in PBS and carborundum
8.7 Check of harvested inoculum
8.8 Shelflife/viability inoculum
9. Format of the test
9.1 Number of plants per genotype ..... at least 30
9.2 Number of replicates
9.3 Control varieties..... Védrantais, 72.025, PI414723, WMR29
9.4 Test design
9.5 Test facility
9.6 Temperature ..... 25^oC /18^oC
9.7 Light ..... 12 h
9.8 Season
9.9 Special measures
10. Inoculation
10.1 Preparation inoculum..... Fresh leaves homogenized in PBS and carborundum
10.2 Quantification inoculum
10.3 Plant stage at inoculation ..... First emergent leaf
10.4 Inoculation method ..... mechanical inoculation by rubbing cotyledons with inoculums
10.5 First observation ..... 15 dpi
*10.6 Final observation..... 20 dpi
11. Observations
11.1 Method..... visual, comparative
11.2 Observation scale ..... **see 6**
11.3 Validation of test ..... on standards
11.4 Off-types
12. Interpretation of data in terms of ..... QL
UPOV characteristic states
13. Critical control points

Current wording:

Ad. 75: Resistance to Muskmelon Necrosis Spot Virus (MNSV), race E_8

A. INOCULUM

Maintenance of strain

Maintenance:	5°C and kept dry using anhydrous calcium chloride
Special conditions:	pre-multiplication on susceptible variety (Védrantais) prior to test

B. INOCULATION AND INCUBATION

Conduct of the test

Plant stage:	1st emergent leaf
Temperature:	25°C during day, 18°C during night
Light:	12 hours per day
Manner of inoculation:	mechanical inoculation by rubbing of cotyledons with inoculum
Duration of test:	
- from sowing to inoculation:	15 days
- from inoculation to reading:	8 days
Number of plants tested:	30

C. SYMPTOMS AND OBSERVATIONS

Susceptible plants:	necrotic lesions on the inoculated organs (cotyledons)
Resistant plants:	no lesions

Proposed new wording:

Ad. 75: Resistance to *Melon necrotic spot virus* (MNSV), E8 strain

1. Pathogen	*Melon necrotic spot virus* (MNSV)
2. Quarantine status	
3. Host species	*Cucumis melo*
4. Source of inoculum	GEVES (F)
5. Isolate	E8 strain
6. Establishment isolate identity	
7. Establishment pathogenicity	on susceptible plant
8. Multiplication inoculum	
8.1 Multiplication medium	living plant
8.2 Multiplication variety	pre-multiplication of the virus on non-wilting variety (Védrantais) prior to testing
8.3 Plant stage at inoculation	10.3
8.4 Inoculation medium	
8.5 Inoculation method	10.4
8.6 Harvest of inoculum	10.1
8.7 Check of harvested inoculum	symptomatic leaves
8.8 Shelflife/viability inoculum	on susceptible variety
9. Format of the test	
9.1 Number of plants per genotype	at least 30
9.2 Number of replicates	
9.3 Control varieties	Védrantais (Susceptible), Virgos, PMR5 (Resistant)
9.4 Test design	
9.5 Test facility	growth chamber
9.6 Temperature	25°C during day and 18°C during night or 22°C constant
9.7 Light	12 h per day
9.8 Season	all seasons
9.9 Special measures	
10. Inoculation	
10.1 Preparation inoculum	Fresh leaves homogenized in PBS and carborundum
10.2 Quantification inoculum	
10.3 Plant stage at inoculation	cotyledon expanded or 1st emergent leaf
10.4 Inoculation method	mechanical inoculation by rubbing of cotyledons with inoculum
10.5 Final observation	8-15 days after inoculation
11. Observations	
11.1 Method	visual
11.2 Observation scale	
[1] susceptible: Védrantais	Necrotic lesions on the inoculated organs, optional: systemic reaction (depends on condition, and varieties), death of plant
[9] resistant: Virgos	No lesions
11.3 Validation of test	on standards
11.4 Off-types	
12. Interpretation of data in terms of UPOV characteristic states	QL
13. Critical control points	

Current wording:

Ad. 76: Resistance to Cucumber Mosaic Virus (CMV)

A. INOCULUM

1. Crushed solution

Phosphate disodic (Na_2HPO_4, 12 H_2O) (0,03M):	1,075 g
Diéthyldithiocarbamate of sodium (= DIECA):	0,2 g
Distilled water:	qsp 100 ml

The phosphate disodic solution can be stored in a refrigerator. Once the DIECA is added, the solution should be used within the next two hours.

2. Crushing the leaves

The source of the inoculum comes from crushing either the fresh leaves, or leaves desiccated in anhydrous calcium chloride (Ca $Cl_{2)}$, in a cold mortar.

Crush 1 gram of leaves with 4 ml of phosphate disodic solution at 5°C. Add active carbon (0,5 g) and carborendum (0,4 g) for each 1 gram of leaves. After crushing, put the mortar on a bed of ice.

Before using leaves dried with $CaCl_2$ to inoculate a plant test, do a multiplication of the inoculum on some 10 susceptible plants which would be used as inoculum.

3. Strains maintenance

CMV can be stored for several years by desiccation with anhydrous $CaCl_2$. Leaves showing mosaic symptoms should be chopped finely with a razor blade and placed in cups. Put a layer of anhydrous calcium chloride (0,5 cm) in a plastic box and cover it with filter paper. Place the cups on this layer. Close the box well with adhesive tape, and then place it in a tightly closed plastic bag. Store it in a refrigerator at 5°C.

B. INOCULATION AND INCUBATION

Cotyledons or young leaves should be inoculated by rubbing them with a latex-protected finger. After a few minutes, rinse the cotyledons with running water. Place the plants for incubation in a growth chamber (generally at 18°C at night and 25°C in the day, with 12 to 14 hours of daylight).

C. SYMPTOMS AND OBSERVATIONS

The “common” strains of CMV bring out mosaic symptoms on susceptible plants one week after inoculation. Resistant plants show no symptoms.

Remarks:

When light intensity and daylight are not sufficient (winter period), resistant plants (in particular PI 161375) may present chlorotic lesions on the first leaf.

Strains:

Use “common” strains (as T1, P9) rather than “song” strains (14, T2).

		CMV common strains (T1, P9)	CMV song strains (14, T2)
Susceptible	Védrantais	mosaïc	mosaic
Resistant	PI 161375	no symptoms	mosaic, chlorotic lesions
	Virgos		

P9 brings out “aucuba” mosaic on susceptible varieties

P9 is less aggressive than T1

It is preferable to use Virgos rather than PI 161375 (lower germination, weaker growth).

Observations, notes:

The genetic resistance is polygenic. Use a notation with classes. It is preferable to use the two strains P9 and T1 to have a better evaluation of the resistance.

High resistance confers resistance on all common strains. Some genotypes may present a resistance to P9 (no symptoms), and a slight susceptibility to T1 (slight mosaic).

Proposed new wording:

Ad. 76: Resistance to *Cucumber mosaic virus* (CMV)

1. Pathogen	*Cucumber mosaic virus* (CMV)
2. Quarantine status	No
3. Host species	*Cucumis melo*
4. Source of inoculum	GEVES (F)
5. Isolate	Use “common” strains (as TI, P9) rather than “song” strains (14, T2).
6. Establishment isolate identity	
7. Establishment pathogenicity	on susceptible melon varieties
8. Multiplication inoculum	don’t use leaves dried with $CaCl_2$ to inoculate, do a multiplication of the inoculum on susceptible plants
8.1 Multiplication medium	living plant
8.2 Multiplication variety	susceptible variety (e.g. Védrantais)
8.3 Plant stage at inoculation	cotyledon expanded or first leaf appearing
8.4 Inoculation medium	ice-cold buffer solution
8.5 Inoculation method	Inoculation by rubbing. Optional: after a few minutes, rinse the cotyledons with running water.
8.6 Harvest of inoculum	symptomatic leaves, e.g.: 1g leaves with 4mL buffer - 0,03 M PBS with 0,2% DIECA freshly added, addition of activated charcoal.
8.7 Check of harvested inoculum	
8.8 Shelflife/viability inoculum	about 2 h
9. Format of the test	
9.1 Number of plants per genotype	at least 30 plants
9.2 Number of replicates	
9.3 Control varieties	Védrantais, 72.025, Virgos, PI161375 *Remark:* It is preferable to use Virgos rather than PI161375 (lower germination, weaker growth).
9.4 Test design	
9.5 Test facility	Climatic room or glasshouse
9.6 Temperature	22°C constant
9.7 Light	12 hours at least
9.8 Season	all seasons in climatic room, in glasshouse, strong environmental effect on the test severity (more severe in winter, too soft in summertime)
9.9 Special measures	
10. Inoculation	
10.1 Preparation inoculum	Fresh leaves homogenized in ice-cold buffer solution- in PBS and carborundum (active charcoal), with 0.2% DIECA freshly added
10.2 Quantification inoculum	
10.3 Plant stage at inoculation	cotyledon expanded or first leaf appearing
10.4 Inoculation method	Inoculation by rubbing. Optional: After a few minutes, rinse the cotyledons with running water, especially when one uses activated charcoal
10.5 Final observation	7-8 days after inoculation
11. Observations	
11.1 Method	visual, comparative
11.2 Observation scale	
[1] susceptible: Védrantais	Mosaics
[9] resistance present: Virgos, PI161375	No symptoms or necrotic spot or very weak symptoms in case of a more aggressive strain like T1 *Remarks:* P9 strain brings out “aucuba” mosaic on susceptible varieties (aggressive symptoms) P9 strain is less virulent than TI strain.
11.3 Validation of test	on control varieties
11.4 Off-types	
12. Interpretation of data in terms of UPOV characteristic states	QL
13. Critical control points	When light intensity and daylight are not sufficient (winter period), resistant plants (in particular PI161375) may present chlorotic lesions on the first leaf. Virgos seeds usually germinate better than seeds of PI161375 (Songwhan Charmi). Resistance breaking CMV strains have been identified (“Song” strains). Intermediate reactions may occur; the resistance is polygenic.

Proposed changes to Chapter 10 “Technical Questionnaire”

To add the following characteristics to Chapter TQ 5:

Resistance to *Fusarium oxysporum* f. sp. *melonis,* race 0 (characteristic 69.1)
Resistance to *Fusarium oxysporum* f. sp. *melonis,* race 1 (characteristic 69.2)
Resistance to *Fusarium oxysporum* f. sp. *melonis,* race 2 (characteristic 69.3)

[Annex II follows]

ANNEX II

Comments by the Subgroup on the Provisional Draft of Document TWV/47/30

Regular color code used in this document:

Comments, remarks, questions sent to the leading expert : ISF, ES, NL
Proposal, remark, answers of the **leading expert**
Controls or differentials quoted in scientific literature (included in MATREF network)

Chapter 5- Grouping of Varieties and Organization of the Growing Trial

5.3 The following have been agreed as **useful grouping characteristics**:
[…]
Proposal to add:

(j) Resistance to *Fusarium oxysporum* f. sp. *melonis*, race 0 (characteristic **69.1)**
(k) Resistance to *Fusarium oxysporum* f. sp. *melonis*, race 1 (characteristic **69.2**)
(l) Resistance to *Fusarium oxysporum* f. sp. *melonis*, race 2 (characteristic **69.3**)

(ISF – MP1) : ISF feel it is **not necessary for grouping** to include *Fusarium oxysporum* f.sp. *melonis* races 0, 1 and 2 and make it ***characteristics.** There are enough characteristics left for grouping and establishing DUS and it might lead to higher cost in the examination.
(ES): We agree with the new draft of disease protocols and to include the resistance to *Fusarium* 0, 1, 2 as **grouping characteristics.** Also to **include the disease resistances in the TQ**
NL: Naktuinbouw **supports the *** for Fom:0,1 and 2. Fom:0,1 and 2 should be included in the **list of grouping characteristics**
FR proposal
To keep char 69.1, 69.2, 69.3 as grouping characteristics, with an asterisk (*). Char. included in the TQ.

Chapter 7-Table of Characteristics/Tableau des caractères/Merkmalstabelle/Tabla de characters

69. (+) QL	VG	Resistance to *Fusarium oxysporum* f. sp. *melonis*	Résistance à *Fusarium oxysporum* f. sp. *melonis*	Resistenz gegen *Fusarium oxysporum* f. sp. *melonis*	Resistencia al *Fusarium oxysporum* f. sp. *melonis*		
69.1 (*)		**Race 0**	Race **0**	~~**Pathotyp**~~ **0**	**Raza 0**		
		absent	absente	fehlend	ausente	Jaune Canari 2, Charentais T	1
		present	présente	vorhanden	presente	Jador, ~~Joker,~~ Védrantais, Charentais Fom-2	9

ISF – MP2: ISF feel that **an asterisk not needed** (see remark under grouping characteristics)
NL: Naktuinbouw **supports the *** for Fom: 0,1 and 2. Fom: 0,1 and 2 should be included in the **list of grouping characteristics**
FR proposal
To keep char 69.1, 69.2, 69.3 as grouping characteristics, with an asterisk (*). Char. included in the TQ.

ISF – F3 Why is it different from controls put in protocols?
FR proposal
It could be harmonized, but we can identify some little particularities for the choice of varieties included:

- Example varieties included in Chapter 7: **Commercial varieties** which are available with the characteristic
- Example varieties included in Chapter 8: **Controls** or differentials quoted in scientific literature (included in MATREF network)
  - Difference of display unnecessary.

To be discussed.
FR remark

- **Joker : cancelled variety, to delete.**

69.	**VG**	**Resistance to *Fusarium oxysporum* f. sp. *melonis***	**Résistance à *Fusarium oxysporum* f. sp. *melonis***	**Resistenz gegen *Fusarium oxysporum* f. sp. *melonis***	**Resistencia al *Fusarium oxysporum* f. sp. *melonis***		
(+)							
QL							
69.2		**Race 1**	Race ~~**Pathotype**~~ **1**	~~**Pathotyp 1**~~	**Raza 1**		
(*)		~~absent~~	~~absente~~	~~fehlend~~	~~ausente~~	Jaune Canari 2, Charentais T, Védrantais	1
		~~present~~	~~présente~~	~~vorhanden~~	~~presente~~	Arapaho, Jador~~,~~ Rubbens~~,~~ ~~Joker~~,~~ Charenaits Fom-2	9

ISF – MP4: ISF feel that **an asterisk not needed** (see remark under grouping characteristics)
NL: Naktuinbouw **supports the *** for Fom:0,1 and 2. Fom:0,1 and 2 should be included in the **list of grouping characteristics**
FR proposal

- **To keep char 69.1, 69.2, 69.3 as grouping characteristics, with an asterisk (*). Char. included in the TQ.**
- **To delete Joker (9): cancelled variety**
- **To add Arapaho (9), Rubbens (9)**

To be discussed.

69.	**VG**	**VG**	**Resistance to *Fusarium oxysporum* f. sp. *melonis***	**Résistance à *Fusarium oxysporum* f. sp. *melonis***	**Resistenz gegen *Fusarium oxysporum* f. sp. *melonis***		
(+)							
QL							
69.3			**Race 2**	Race ~~Pathotype~~ 2	~~**Pathotyp**~~ **2**	**Raza 2**		
(*)			absent	absente	fehlend	ausente	Arapaho, Rubbens Jaune Canari 2, ~~Joker~~, Charentais T, Charentais Fom-2	1
			present	présente	vorhanden	presente	Anasta, Cléo, Jador, Védrantais	9

ISF – MP5: ISF feel that **an asterisk not needed** (see remark under grouping characteristics)
NL: Naktuinbouw **supports the *** for Fom:0,1 and 2. Fom:0,1 and 2 should be included in the **list of grouping characteristics**
FR proposal

- **To keep char 69.1, 69.2, 69.3 as grouping characteristics, with an asterisk (*)**
- **To delete Joker (1): cancelled variety**
- **To add Arapaho (1), Rubbens (1), Anasta (9), Cléo (9)**

To be discussed.

69.	**VG**	**Resistance to *Fusarium oxysporum* f. sp. *melonis***	**Résistance à *Fusarium oxysporum* f. sp. *melonis***	**Resistenz gegen *Fusarium oxysporum* f. sp. *melonis***	**Resistencia al *Fusarium oxysporum* f. sp. *melonis***		
(+)							
QL							
69.4		**Race 1-2**	Race ~~**Pathotype**~~ **1-2**	~~**Pathotyp**~~ **1-2**	**Raza 1-2**		
(+)		absent	absente	fehlend	ausente	Jaune Canari 2, ~~Joker,~~ Védrantais, Virgos	1
		moderately resistant				Lunasol	2
		highly resistant				Dinéro, Isabelle~~, Jador~~	3

ISF – MP6: ISF feel that an **asterisk not needed** (see remark under grouping characteristics)
FR proposal
We agree without asterisk, not a grouping characteristic.
To be discussed.

ISF – F7: *Fusarium* race 1-2 is **not a monogenic trait**, it is a **quantitative trait**. It is not something that is either present or absent, it is something for which there is a **level on a continuous scale from 1 to 9**.

FR proposal

To modify the way to describe this characteristic, with a relative scale with 3 states.

- absent (1): Jaune Canari 2, Védrantais, Virgos
- moderately resistant (2) Lunasol
- highly resistant (3) Isabelle, ~~Jador,~~ Dinéro

- Lunasol is the variety to illustrate the minimum resistance level for the state "moderately resistant". We prefer not display Manta here, to avoid confusion, because Manta's behavior is intermediate between Lunasol and Dinéro / Isabelle.
- To add Dinéro as example variety highly resistant to replace Jador.
- To delete Joker (1): cancelled variety

To be discussed.

NL: the issue is not whether the resistance is **polygenic**, but whether the result is **reproducible**

FR proposal

To test an adequate number of assessed plants to allow the use of statistical method if necessary.

To be discussed.

70. (+) QN	**VG**	**Resistance to *Podosphaera xanthii (Sphaerotheca fuliginea)* (Powdery mildew)**	**Résistance à *Podosphaera xanthii (Sphaerotheca fuliginea)* (oïdium)**	**Resistenz gegen *Podosphaera xanthii (Sphaerotheca fuliginea)* (Echter Mehltau)**	**Resistencia a *Podosphaera xanthii (Sphaerotheca fuliginea)* (Oidio)**		
70.1		**Race 1**	Race ~~**Pathotype**~~ **1**	~~**Pathotyp**~~ **1**	**Raza 1**		
		susceptible	sensible	anfällig	susceptible	~~Alpha,~~ ~~Boneto, Delta,~~ ~~Jerac,~~ Jaune Canari 2, Védrantais	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	Escrito	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Cézanne, Anasta, ~~Théo~~ PMR45, PMR5, Edisto 47	3

ISF – MP8: ISF think *Podosphaera xanthii* race 1 **no longer relevant for Europe** – IF it is **still relevant outside Europe**, we have no problem keeping it.

NL: May be kept for **historic reference**. Only when the **race is no longer available**, it has to be **deleted**.

FR questions

- Is Px1 is still relevant somewhere?
- Where it is available?
  - INRA answer: it is not relevant in Europe anymore. Interest for other races more virulent.
  - ➢ **Interest of Px 1 to be discussed**

NL: Adding Védrantais is OK. (Px1: **susceptible**) **FR answer: Agree.**

ISF – F9: Alpha should be **moderately resistant**. It has Pm-1 gene at heterozygous stage. Védrantais should be put as a control here. **FR answer: Alpha is cancelled in 2013 (**time to market for 3 years).

ISF – F10: Why controls of the protocols are not listed here ? **PMR45** is the control for resistance. It is **intermediate** in expression. **FR answer: PMR45** isn't moderately but highly resistant.

FR proposal

- to detete Alpha (1), Boneto (1), Delta(1), Théo (3) which are cancelled
- to add Védrantais, Jaune Canari 2 (1) susceptible (to replace Jérac by Jaune Canari 2)
  Eecrito (2)
  PMR45, PMR5, Edisto 47:(3) highly resistant

70. **(+)** **QN**	**VG**	**Resistance to *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Powdery mildew)**	**Résistance à *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (oïdium)**	**Resistenz gegen *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Echter Mehltau)**	**Resistencia a *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Oidio)**		
70.2		**Race 2**	Race ~~**Pathotype**~~ **2**	~~**Pathotyp 2**~~	**Raza 2**		
		susceptible	sensible	anfällig	susceptible	~~Boneto~~, Galoubet, Védrantais, PMR45, ~~Alpha~~	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	~~Flores, Enzo~~, Escrito, Pendragon	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	Anasta, Cézanne, ~~Théo~~ PMR5, Edisto 47	3

ISF – F11: Px2 Susceptible: Should include Védrantais, PMR45, eventually Alpha would fit here.

FR proposal

- **to detete Alpha (1), Boneto (1), Enzo (2), Flores(2), Théo (3) which are cancelled**
- **to add Védrantais, PMR45 : susceptible (1)**
- **to add Pendragon: moderatly resistant (2)**
- **to add PMR5, Edisto 47 : highly resistant (3)**
-

➢ **To validate.**

70. **(+)** **QN**	VG	Resistance to *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Powdery mildew)	Résistance à *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (oïdium)	Resistenz gegen *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Echter Mehltau)	Resistencia a *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Oidio)		
NEW (FR-1) 70.**	**VG**	**Race 3**					
		susceptible				Védrantais, PMR45, PMR5	1
		moderately resistant				WMR29, Nettuno	2
		highly resistant				Edisto 47, Godiva, Batista	3

FR proposal

To include the characteristic Resistance to *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Powdery mildew) **race 3.**

- **to add Védrantais, PMR45, PMR5: susceptible (1)**
- **to add WMR29, Nettuno: moderatly resistant (2)**
- **to add Edisto 47, Godiva, Batista : highly resistant (3)**

To be discussed.

70. **(+)** **QN**	VG	Resistance to *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Powdery mildew)	Résistance à *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (oïdium)	Resistenz gegen *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Echter Mehltau)	Resistencia a *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Oidio)	
70.~~3~~		**Race 5**	Race ~~**Pathotype**~~ **5**	~~**Pathotyp**~~ **5**	**Raza 5**	
		susceptible	sensible	anfällig	susceptible	Védrantais, Edisto 47 1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	~~Enzo~~, ~~Flores~~, Hugo, Pendragon 2
		highly resistant	hautement résistant	hochresistent	altamente resistente	~~Gaétano~~, ~~Lucas~~, ~~Théo~~, Arapaho, PMR5 3

ISF – F12: susceptible (1): Védrantais: Interesting!
FR answer: Védrantais is susceptible to all *Px.*
ISF – F13: moderatly resistant: Should include Anasta, Cézanne
FR answer: No; Hugo, Pendragon that's enough.

FR proposal
- to detete Enzo (2), Flores (2), Gaétano (3), Lucas (3), Théo (3) which are cancelled
- to add Edisto 47: susceptible (1)
- to add Hugo, Pendragon : moderatly resistant (2)
- to add PMR5, Arapaho : highly resistant (3)

70. **(+)** **QN**	VG	Resistance to *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Powdery mildew)	Résistance à *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (oïdium)	Resistenz gegen *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Echter Mehltau)	Resistencia a *Podosphaera xanthii* (*Sphaerotheca fuliginea*) (Oidio)	
NEW (ISF) 70.** **QN**	**VG**	**Race 3-5**				
		susceptible				Védrantais, PMR5, Edisto 47 1
		moderately resistant				~~AR Hale's Best Jumbo~~, Cisco 2
		highly resistant				~~PI 414723~~, SVI 0105, 90625 3

ISF to add the characteristic Resistance to Podosphaera xanthii (Sphaerotheca fuliginea) (Powdery mildew) **race 3-5**
FR proposal
To include this characteristic.
Controls proposed:
- **susceptible (1):** Védrantais, PMR5, Edisto 47
- **moderatly resistant (2):** We prefer **not to use** AR Hale's Best Jumbo here and illustrate this state with the variety Cisco, which behavior less subject to interpretation.
  AR Hale's Best Jumbo (AR HBJ) is the control to check all the potential intermediate behavior of *Px* races.

	AR HBJ behavior
Px 1	**Susceptible**: if use of a strain of the type 1B such as the strain 06Sm10
	Resistant: if use of a strain of the type 1A such as the strain Sm 3
Px 2	**Susceptible**: if use of a strain of the type 2B
	Resistant: if use of a strain of the type 2A such as the strain S87.7
Px 3	Only one type of strain : strain 3B
Px 5	**Susceptible**: if use of a strain of the type 5B
	Resistant: if use of a strain of the type 5A
Px 3-5	**Susceptible**: if use of a strain of the type 3-5B
	Resistant: if use of a strain of the type 3-5A

Up to now, in the current pathological tests, it is the following strains which are used:

- Px 1 strain type 1A
- Px 1 strain type 2A
- Px 1 strain type 3B
- Px 1 strain type 5B
- Px 1 strain type 3-5A

In the pedigree of AR HBJ, there is PI 414723. In reason of the complexity of this running work (several research projects on going), we prefer not to use here these controls.

- **highly resistant (3):** We prefer **not to use** PI 414723AR (see reason above). We propose to make reference to 90625, an Indian line which enjoys international references, whereas the line SVI 0105 is more an internal French reference (not published in international literature).

To be discussed.

71. (+)	**VG**	**Resistance to *Golovinomyces cichoracearum* (*Erysiphe cichoracearum*) Race 1 (Powdery mildew)**	**Résistance à *Golovinomyces cichoracearum* (*Erysiphe cichoracearum* Race ~~Pathotype~~ 1 (oïdium)**	**Resistenz gegen *Golovinomyces cichoracearum* (*Erysiphe cichoracearum* ~~Pathotyp~~ 1 (Echter Mehltau)**	**Resistencia a *Golovinomyces cichoracearum* (*Erysiphe cichoracearum* Raza 1 (Oidio)**		
QN		susceptible	sensible	anfällig	susceptible	~~Bastion, Bonetto,~~ Védrantais, Edisto 47, Escrito, Score	1
		moderately resistant	moyennement résistant	mäßig resistent	moderadamente resistente	~~Flores~~, Anasta	2
		highly resistant	hautement résistant	hochresistent	altamente resistente	~~Cézanne,~~ Heliobel, ~~Théo~~, PMR45, 90625	3

ISF – F14 highly resistant, **Cézanne** Not sure, I would put in moderately….
FR proposal

- to detete Bastion (1), Bonetto (1), Flores (2) , Théo (3) which are cancelled
- **susceptible (1):** Védrantais, to add : Edisto 47, Escrito, Score
- **moderatly resistant (2):** Anasta
- **highly resistant (3):**
  - to add: PMR45, 90625
  - status of **Cézanne** to be check, not to include as control here.

72. (+)	**VG**	**Resistance to colonization by *Aphis gossypii***	**Résistance à la colonisation par *Aphis gossypii***	**Resistenz gegen Befall durch *Aphis gossypii***	**Resistencia a la colonización por *Aphis gossypii***		
QL		absent	absente	fehlend	ausente	~~Charentais,~~ Védrantais	1
		present	présente	vorhanden	presente	~~AR- Top Mark~~ , ~~AR, Margot~~, AR Hale's Best Jumbo, Heliobel, Godiva, Virgos	9

ISF – F15: Why not Védrantais ? what interest to introduce a new control, since Védrantais is perfectly susceptible
FR anwer: Agree

ISF – F16: "AR"doesn't exist
ISF – F17: Top-Mark is susceptible. It is AR-TopMark which is resistant, AR=Aphid Resistant. Probably a **typing mistake**.
FR anwer: Agree

NL reference

- **AR Topmark reference**: McCreight, J. D., A. N. Kishaba & G. W. Bohn, 1984.
- **AR Hale's Best Jumbo**, AR 5, and AR Topmark: Melon aphid-resistant muskmelon breeding lines. HortScience 19: 309–310.

FR proposal

- (1) absent Védrantais
- (9) present to replace AR-Top Mark by AR Hale's Best Jumbo, which is an control even indluded in this guideline
  to add Heliobel, Godiva, Virgos
  to delete Margot because cancelled.

73. (+)	**VG**	**Resistance to *Zucchini yellow mosaic virus* (ZYMV) Race F**	**Résistance au virus de la mosaïque jaune de la courgette (ZYMV)** Race ~~**Pathotype**~~ **F**	**Resistenz gegen Zucchinigelb-mosaikvirus (ZYMV),** ~~**Pathotyp**~~ **F**	**Resistencia al virus del mosaico amarillo del calabacín (ZYMV)** **Raza F**		
QL		absent	absente	fehlend	ausente	~~Alpha, Boule d'Or,~~ ~~Cantor,~~ ~~Doublon,~~ Génésis Védrantais	1
		present	présente	vorhanden	presente	PI 414723 ~~Eloro, Hermes,~~	9

ISF – F18: Eloro, Hermès : state 9 I am surprised of this. Would need confirmation….
NL: Eloro and Hermes: please check whether these **old varieties** are still alive. Are there more recent examples?

NEW 73.	VG	**Resistance to *Zucchini yellow mosaic virus* (ZYMV)**			
(+)					
		If use of the a* F type *strain (ex: strain 13.18Fn)			
		gene **Zym absent** $Zym^+/$ Epistatis of the gene Zym on the gene Fn is **not operational,** so the state of the Fn gene can be observed: gene **Fn absent:** Fn^+/Fn^+ **symptom: Susceptibility reaction** Final phenotype : mosaic		Védrantais	**1-a**
		gene **Zym absent** $Zym^+/$ Epistatis of the gene Zym on the gene Fn is **not operational,** so the state of the Fn gene can be observed: gene **Fn present**: Fn^+/Fn **symptom: systemic hypersusceptibility reaction** Final phenotype : Flacida necosis *But less quick than in the following case*		~~Cantor~~	**1-b**
		gene **Zym absent** $Zym^+/$ Epistatis of the gene Zym on the gene Fn is **not operational,** so the state of the Fn gene can be observed: gene **Fn present**: Fn/Fn **symptom: systemic hypersusceptibility reaction** Final phenotype : Flacida necosis		~~Doublon~~, ~~Boule d'Or~~, Génésis, Galoubet, Hélios	**1-c**
		gene Zym present: Zym / Zym **Epistatis** of the gene Zym on the gene Fn is **operational**, so the state of the **Fn** gene **can't be** observed. **symptom: localised hypersusceptibility reaction** Final phenotype : local necrosis - Resistance		PI 414723, Lunaduke, Polinyka	**9**

	If use of a* NF *type strain (ex: strain E15)		
	1-gene Zym absent Zym+ **symptom: Susceptibility reaction** Final phenotype : **mosaic**	~~Doublon~~, ~~Boule d'Or~~, Génésis, Galoubet, Hélios Védrantais	**1**
	gene Zym present: Zym / Zym **symptom: localised hypersusceptibility reaction** Final phenotype : **local necrosis - Resistance**	PI 414723, Lunaduke, Polinyka	**9**

FR proposal

- Alpha, Cantor, Doublon, Boule d'Or (state 1), Eloro, Hermès (state 9) are cancelled - To delete
- to replace Doublon, by Génésis which are both (Zym$^+$; Fn/Fn)
- which variety can replace Cantor (Zym$^+$; Fn$^+$/Fn)?
- to check the attribution of controls.

Remark: The gene Vat and the gene Fn are linked in repulsion.

To be validated.

74. VG (+) QL	**Resistance to *Papaya ringspot virus* (PRSV)**	**Résistance au virus des taches annulaires du papayer**	**Resistenz gegen Papayaringflecken-virus (PRSV)**	**Resistencia al virus de la mancha anular del papayo (PRSV)**		
74.1	**GVA strain**	Souche **GVA**	~~**Pathotyp**~~ **GVA**	~~**Raza**~~ **GVA**		
	absent	absente	Fehlend	ausente	Védrantais	1
	present	présente	vorhanden	presente	WMR~~V~~ 29, 72.025	9
74.2	**E_2 strain**	Souche **E2**	~~**Pathotyp**~~ **E2**	~~**Raza**~~ **E2**		
	absent	absente	Fehlend	ausente	Védrantais, 72.025	1
	present	présente	Vorhanden	presente	WMR~~V~~ 29	9

ISF – F19 I don't know this strain. (GVA)
FR answer: No additional reference on this strain. We mainly the strain E2, which was isolated in France and elsewhere. I suppose it could be in relation with the strains **Gua**deloupe …?

ISF –F20 "**72.025**": I don't know this material. I guess it has Prv² allele.
FR answer: The line **72.0285** is a line **selected by INRA Guadeloupe**. It is resistant to the Guadeloupe strain.
The line 72.025 has the Prv² allele, as the line PI414723.

NL When companies claim resistance to PRSV, does this means **resistance to** E2 **or** GVA?
FR answer:I don't know exactly.

NL Are there any examples of commercial varieties with the same phenotype as **line 72.025**?
If no examples can be given, **what is the relevance of keeping this characteristic**? No claims known in NL applications.
FR answer

No claims up to now in French applications.
Which relevance to keep this characteristic? To be discussed.

FR proposal

- to replace WMR~~V~~29 by WMR29
- **GVA strain**: it could be a mistyping… It could be the **Guadeloupe strain** (GUA strain)
- Gene Pvr, with 3 loci
  - Pvr $^{+}$: **susceptibility allele**
  - Pvr^{1}: in the strains Guadeloupe, Florida and E2: **resistance allele.**
  - Pvr^{2}:
    - in the strains Guadeloupe and strain Florida there is a **resistance allele** (**hyper susceptibility**)
    - in the strain E2 : **incompatibility reaction** (generalized necrosis, death)

	Védrantais	**WMR 29**	**PI414723 72.025**
Prv alleles	Prv^{+}	Prv^{1}	Prv^{2}

Strain Guadeloupe Strain Florida	susceptible (mosaic)	resistant	resistant (hyper susceptibility)
Strain E2	susceptible (mosaic)	resistant	Incompatibility reaction necrosis, death

NEW **74.**	**VG**	**Resistance to *Papaya ringspot virus* (PRSV)** **Pvr gene**		
(+)				
74.1		**Guadeloupe strain**	**Souche Guadeloupe**	
QL		absent (allele Prv^{+}) **mosaic** present (alleles Prv^{1}, Prv^{2}) **resistant**	Védrantais 72.025, PI414723, WMR 29,	1 9
74.2		**E2 strain**	**Souche E2**	
QL		absent (allele Prv^{+}) **mosaic** absent (allele Prv^{2}) Incompatibility reaction **necrosis, death** present (alleles Prv^{1}) **resistant**	Védrantais, 72.025, PI414723, WMR29	1-a 1-b 9

FR proposal

- To add PI414723 as control. Same behavior as the line 72.025.
- the use of the E2 strain is more informative than the use of the Guadeloupe strain. It allow to describe the state of the 3 alleles of the Pvr gene.

To be discussed.

75. **(+)**	**VG**	**Resistance to *Melon necrotic spot virus* (MNSV) E8 strain**	**Résistance au virus de la criblure du melon (MNSV) Souche E8**	**Resistenz gegen Netzmelonen-nekrosefleckenvirus (MNSV), ~~Pathotyp~~ E8**	**Resistencia al virus del cribado del melón (MNSV) ~~Raza~~ E8**		
QL		absent	absente	fehlend	ausente	Védrantais,	1
		present	présente	vorhanden	presente	Primal, Cyro, Yellow Fun, Virgos, PMR5	9

FR proposal
To add PMR5 as control for state (9)

76. **(+)**	**VG**	**Resistance to *Cucumber mosaic virus* (CMV)**					
QL		absent	absente	fehlend	ausente	~~Cézanne, Dalton,~~ Védrantais	1
		present	présente	vorhanden	presente	Lunaduke, PI161375, Virgos	9

ISF – F21: **Cézanne** (state 1) Again, why not Védrantais ?
FR answer: I agree . Védrantais, that's enough as reference for the susceptible control.

ISF – F22: **Lunaduke** (state 9): This is **not a good control**. Nobody can provide seeds of this hybrid. I asked Nunhems, ASL, INRA. Virgos could be put, but it has a **too high resistance level**. PI 161375 could be a **good control.**

FR remark:
PI 161375: Korean line, which name in Korean is "Song Whan Charmi". It is progenitor of Virgos. It is use to identified the "song" CMV strains, able to attack this line and Virgos. The "song" strains (14strain, Tz strain or I17F strain) are more virulent than the common strains (Tl strain, P9 strain), which are not able to attack PI161375 and Virgos.

FR answer:
The resistance to CMV is a quantitative resistance. It is assessed up to now according the protocol for a qualitative resistance.
We prefer :

- to keep Virgos and Lunaduke as resistant control. Lunaduke is always maintained in the French offical catalogue. It can be purchased.
- And add the control PI161375.

FR proposal:
Resistance to *Cucumber mosaic virus* (CMV)

- absent Védrantais, 1
- present Lunaduke, Virgos, PI161375, 9

Chapter 8 - Explanations on the Table of Characteristics

Ads. 69.1 - 69.3: Resistance to *Fusarium oxysporum* f. sp. *melonis*, Races 0, 1 and 2 **(Fom)**

6. Establishment isolate identity ..... use differential varieties: Charentais T, Védrantais, Charentais Fom-2, ~~Joker~~, ~~Margot~~, **Isabelle, Jador**

ISF – F23: "Isabelle, Jador" **No use here**. Margot is enough for it has Fom-1 and Fom-2 gene, and is susceptible to Fusarium race 1-2

FR answer: I don't agree. Margot is cancelled.

FR proposal

To use differential varieties: Charentais T, Védrantais, Charentais Fom-2

10.4 Inoculation method ..... soaking of the root system in a suspension of liquid medium of fungus ..... **at least 5 min**

ISF – F24: "at least 5min": This is **optional**. 30 seconds are enough, even less if one takes care of having all roots in contact with inoculum suspension.

FR proposal

Optional: At least 30sec -5min

11.2 Observation scale

[1] Susceptible ..... Growth retardation, wilting, yellow cotyledons, internal vessel browning, ... death of plant

ISF – F25: "**Growth retardation**": Not a good criteria

NL: **Growth retardation (in combination with yellowing or wilting**) can be **useful for judging the severity of Fusarium attack**; controls should preferably be mock-inoculaed for this reason.

ISF – F26: "**internal vessel browning**": Optional. Not necessary. We never look at vessels. It is not as informative as it is in case of tomato and Fusarium.

NL: We also don't use vessel browning to judge the severity of Fusarium attack.

However, it helps as a diagnostic character, to distinguish Fusarium from other types of rotting like Pythium.

FR / NL proposal

We share the NL point of view about the interest of "Growth retardation combined with other observation" and the optional interest of the observation of the "internal vessel browing".

To keep:

[1] Susceptible ..... Growth retardation in combination with yellowing or wilting cotyledons (useful for judging the severity of the attack), Optional: internal vessel browning, death of plant.

Ad. 69.4: Resistance to *Fusarium oxysporum* f. sp. *melonis*, Race 1-2 **(Fom)**

5. Isolate ..... **Fom: 1.2**

ISF – F27: Need to **specify which isolate** is used?? There is a high variability in race 1-2 isolates.
NL Suggestion: 5. Isolate….. Fom: 1.2 (moderately aggressive)
FR / NL proposal
Fom: 1.2 (moderately aggressive): TST strain

6. Establishment isolate identity ..... use differential varieties: **Virgos**, Védrantais, Lunasol, Manta, Isabelle, Dinero, Jador

ISF – F28: "**Virgos**": Definitely **not a good control**. Will not grow well enough. ~~**Margot**~~ is the **control to use as susceptible**. It has **both Fom-1 and Fom-2**, and is **susceptible to race 1-2**.
FR proposal
We don't meet problem with the use of the variety Virgos. So we propose:
use differential varieties: susceptible: Védrantais, Virgos; moderately resistant : Lunasol; highly resistant: Isabelle, Dinéro, Jador

9. Format of the test

9.1 Number of plants per genotype..... at least 20

ISF – F29: Again, it is a quantitative trait. Need **5 reps of 12 plants** to be able to make **statistical analysis**, and determine if **level of resistance** is significantly different or not **from Lunasol**.
NL: If five repeats are really necessary for Fom:1.2 testing, **we wonder** whether this characteristic is suitable for variety description and **whether QL** can be **maintained** under point 12.
FR proposal
Number of plants per genotype at least 30
Remarks: It is a quantitative trait: necessity of replications, a sufficiently large number of plants to allow the use of a statistical analysis to determine if the level of resistance is significantly different or not from Lunasol.

9.3 Control varieties.....

[1] Susceptible ..... ~~Virgos,~~ Védrantais
ISF – F30 No use Virgos but use ~~Margot~~
FR proposal
We work with Virgos (included in the MATREF network). So we propose:
[**1] Susceptible** ..... **~~Margot~~ (cancelled), Virgos, Védrantais**

9.5 Test facility ..... glasshouse or climatic room

ISF – s31: Greenhouse? -
FR proposal
"Glasshouse" or "Greenhouse". I don't identify a technical difference between these wordings.

9.8 Season..... all seasons

ISF – F32: Not correct. There is a strong environmental effect if grown in the greenhouse.
Winter is too severe. Summer is too mild
FR proposal
All seasons in a climatic room / in a greenhouse: be aware of the strong environmental effect: winter could be too severe and summer could be too mild.

10.4 Inoculation method ..... Soaking of the root system in spore suspension; 700 ml for a tray with 25 - 30 plants, plants are not uprooted

ISF – F33 to replace "soaking of the root system" by "Soaking of the trays"
ISF – F34 "plants are not uprooted": correct
FR proposal
Soaking of the trays in spore suspension; 700 ml for a tray with 25 - 30 plants, plants are not uprooted.

10.5 First observation ..... ISF proposal :14 dpi ~~7~~
10.6 Second observation ..... ISF proposal :21 dpi ~~14~~
***10.7 Final observations** ..... ISF proposal :28dpi ~~21~~
FR proposal
10.5 First observation ..... **7 - 14 dpi**
10.6 Second observation ..... **14 - 21 dpi**
***10.7 Final observations** **21- 28dpi**

11.2 Observation scale ..... Symptoms:
[1] Susceptible: Védrantais..... Growth retardation, yellow cotyledons, drying,
..... internal vessel browning, death of the plant

ISF – F35 “internal vessel browning” : Optional. Not necessary. We never look at vessels. It is not as informative as it is in case of tomato and Fusarium.

FR proposal

[1] Susceptible: Védrantais ..... **Growth retardation, yellow cotyledons, drying,**
..... **internal vessel browning (optional), death of the plant**

[9] Resistant Symptoms may be present, but the level of expression must be distinctly lower than in the susceptible control variety.
..... = the lowest level of resistance is defined by the behavior of Lunasol

ISF – F36 “the level of expression must be distinctly lower “:That’s why replications are needed, for statistical analysis.

FR proposal

We agree the remark.

Symptoms may be present, but the level of expression must be distinctly lower(interest of replication / statistical analysis) than in the susceptible control variety = the lowest level of resistance is defined by the behavior of Lunasol.

Ads. 70.1 to 70.3: Resistance to Powdery mildew *Podosphaera xanthii* (*Sphaerotheca fuliginea*) Px (Sf)
Ad. 71: Resistance to Powdery mildew *Golovinomyces cichoRacearum (Erysiphe cichoRacearum)* Gc (Ec)

6. Establishment isolate identity ..... on differentials:

	Powdery Mildew						
	***Podosphaera xanthii* (*Sphaerotheca fuliginea*)**					***Golovinomyces cichoRacearum* (*Erysiphe cichoRacearum*)**	
	race 0	**race 1**	**race 2**	**race 4**	**race 5**	**race 0**	**race 1**

ISF – F37: "race 4": Nobody can provide a race 4. Doesn't exist.
NL: *Px* race 4 can be deleted if it is no longer available.
NL: About relevance of **Px: 3.5** we have no opinion. However, it is important to consider also reliability of the protocol, in particular for IR scores

FR proposal
***Px* race 4 is an artifact. It doesn't exist really.**
To delete *Px* race 4
To include *Px* race 3, *Px* race 3-5
on differentials:

	Powdery Mildew								
	***Podosphaera xanthii* (*Sphaerotheca fuliginea*)**							***Golovinomyces cichoracearum (Erysiphe cichoracearum)***	
	race 0	**race 1**	**race 2**	~~**race 4**~~	**race 3**	**race 5**	**race 3-5**	**race 0**	**race 1**
~~Iran H~~	~~S~~	~~S~~	~~S~~	~~S~~		~~S~~		~~S~~	~~S~~
Védrantais	R	S	S	~~S~~	S	S	S	R	S
Nantais Oblong	R	S	S	~~S~~	S	S	S	R	**R**
PMR 45	R	**R**	S	~~S~~	S	S	S	R	S
WMR 29	R	**R**	**R**	~~S~~	**R**	S	S	R	S
Edisto 47	R	**R**	**R**	~~R~~	**R**	S	S	R	S
PI 124112	R	**R**	**R**	~~R~~	**R**	**R**	**R**	R	**R**
PMR 5	R	**R**	**R**	~~R~~	S	**R**	S	R	**R**
AR Hale's Best Jumbo							**R**		

Legend: S susceptible (high sporulation); , R resistant (low sporulation)

8. Multiplication inoculums
8.1 Multiplication medium ..... Detached cotyledon in Petri-dish on 0,5 % Agar ~~with 1% sucrose~~ and ~~2~~ 1% mannitol
ISF – F38: Sucrose not needed. It is not good for preservation
FR proposal
Detached cotyledon in Petri-dish on 0.35 - 0,5 % Agar, 1-2% mannitol, optional: 1% sucrose

8.3 Plant stage at inoculation Young, unfolded cotyledon; decontaminated with e.g. 0,05% mercuric chloride or 3 à 5%.bleach (NaClO + NaCl)
ISF – F39: "decontamined": Not necessary if cotyeldons are obtained in clean enough conditions. On an other hand, decontamination is never 100% efficient
FR proposal
We prefer to keep "decontaminated" even if it is not 100% efficient.

8.8 Shelflife/viability inoculums - on cotyledon, 17-23°C, under very low light intensity.

ISF – F40 "low light intensity": Around **1000Lux fluorescent tubes**
FR proposal
We don't agree to add this proposal; it is highly dependent of the type of climatic room or greenhouse. To keep as it is.
- Maximum storage time is 1 to 1.5 months, after the inoculation

ISF – F41: "after the inoculation": In the described conditions, viability is no longer than 15days. In case of longer term preservation, inoculate locally with a few spores, and store at 14°C/12hours low light per day.
FR proposal
- **Maximum storage time is 15 days ~~1 to 1.5 months~~, after the inoculation**

Remark: In case of longer term preservation, inoculate locally with a few spores, and store at 14°C/12hours low light per day.

9.4 Test design ..... Leaf discs placed on 0,4% agar with 1~~–4~~% mannitol and 0,003% benzimidazol.
ISF – F42 …"1% mannitol and 0,003% benzimidazol: This is optional
FR proposal
Leaf discs placed on 0,4% agar with 1–4% mannitol and (optional) 0,003% benzimidazol

9.7 Light..... Optional 24 h darkness after inoculation - at least 12h
ISF – F43 "at least 12h": Optional. Light is low enough
FR proposal
Optional 24 h darkness after inoculation – optional: at least 12h

10.2 Quantification inoculum ISF proposal: 100 to 400 spores per cm²
FR proposal
Additional proposal is too precise. To let open.

10.5 First observation ISF proposal 8-9 dpi ~~10~~
***10.7 Final observations** ISF proposal 11-12dpi ~~11~~
FR proposal
10.5 First observation **8-10 dpi**
***10.7 Final observations** **11-12dpi**

Ad. 72: Resistance to colonization by *Aphis gossypii*

5. Isolate ..... No strain variation reported

ISF – F44 This is wrong! With the described protocol, only the NM1 clone is working.

FR proposal

Isolate: NM1 clone

8.5 Inoculation method ..... deposit 10 adullt wiglessaphids per plant, or

9.3 Control varieties.....

[1] Susceptible: ..... Védrantais, Top Mark ~~Charentais~~

[9] Resistant: ..... ~~Margot~~, AR Hale's Best Jumbo, AR-Top Mark, Virgos

ISF proposal

FR proposal

(1) Védrantais could be enough

(9) Virgos, AR Hale's Best Jumbo, AR Top Mark could be enough

9.6 Temperature..... 21°C

ISF – F45: 21-23°C day/16-20°C night

FR proposal

21-24°C day/16-20°C night

10.4 Ino

11.2 **Observation scale** .....

.....[1] Susceptible: Védrantais ~~Charentais~~ 9 or 10 adult aphids per plant; eggs frequent.

ISF – F46: It is **not eggs**, it is larvae. *A.gossypii* is viviparous

FR proposal

Védrantais 9 or 10 adult aphids per plant; larvea frequent.

.....[9] Resistant: ~~Margot~~,

..... AR Top Mark, Virgos less than 7 adult aphids per plant; larvae rare.

FR proposal

.....Virgos, AR Hale's Best Jumbo less than 7 adult aphids per plant, larvae rare.

13. Critical control points

[…]

ISF proposal

.....Normally ~~the aphids~~ *Aphis gossypii* is ~~are~~ viviparous, ~~but sometimes *Aphis gossypii* may produce eggs.~~

NL: Good point about strain variation within *A. gossypii*. Reference: Thomas et al, Arthropod-plant interactions 6(1) - *A gossypii* is **viviparous** and in autumn on specific crops **sometimes oviparous**. There are numerous studies about oviparous *A. gossypii*. Nevertheless, this information is out of place in this protocol. If this point would be decided by a vote, I would vote **against eggs** and **in favour of larvae**

FR proposal

.....Normally *Aphis gossypii* is viviparous, ~~but sometimes (in autumn, on specific crops may produce eggs.~~

Ad. 73: Resistance to *Zucchini yellow mosaic virus* (ZYMV), F strain

13. Critical control points..... heterozygous (Fn/Fn+) wither and die more slowly than homozygotes (Fn/Fn)

..... use the pathotype F of ZYMV

ISF – F47: Something is not clear in this protocol. What is the goal?

- Is it to show presence of Zym gene (resistance to ZYMV)
- or is it to determine the presence of Fn (quick death in case of F pathotype)?

Fn is not taken in account in variety description, correct?

in this case, pathotype NF will also work.

What is **important** is to **use a pathotype 0**, because pathotypes 1 and 2 overcome resistance of PI414723.

NL Is it really necessary to use and mention this gene when the aim is to detect Zym? We do not support this characteristic when there are no examples of varieties. No claims known in NL applications

FR proposal

5. Isolate Strain F, sub strain 0F = strain 13.18Fn, or Strain NF, sub strain 0NF

6. Establishment isolate identity

	F (ex : strain 13.18 Fn)			NF (ex : strain E15 PAT)		
Sub-strain	**0F**	**1F**	**2F**	**0NF**	**1NF**	**2NF**
Védrantais Zym+; Fn+	Mosaic- **Susceptible**	Mosaic- **Susceptible**	Mosaic- **Susceptible**	Mosaic- **Susceptible**	Mosaic- **Susceptible**	Mosaic- **Susceptible**
~~Doublon~~ Génésis Zym+ / Fn	Wilting, necrosis - **Susceptible**	Wilting, necrosis **- Susceptible**	Wilting, necrosis - **Susceptible**	Mosaic- **Susceptible**	Mosaic- **Susceptible**	Mosaic- **Susceptible**
PI 414723 Zym / Fn	**Resistant**	Mosaic, necrosis **Intermediate**	Mosaic- **Susceptible**	**Resistant**	Mosaic, necrosis **Intermediate**	Mosaic- **Susceptible**

In paragraph **9.3 and 11.2:**

To replace Doublon (which is cancelled) by Génésis which have the same profil Zym+ / Fn

13. Critical control points

The interest to work with the strain F – sub strain 0F (ex: 13.18Fn) is to describe more precisely the phenotype of the assessed varieties, and especially the phenotype of the susceptible ones (Zym+), which can be:

- **mosaic (Fn+)**
- **or wilting necrosis (Fn)**

If this level of description of the susceptible varieties is not required, it is possible to work with a strain NF- sub strain NF0 (importnance of the sub-strain), because pathotypes 1 and 2 overcome resistance of the variety PI414723 , which is the resistance control. .

Ad. 74: Resistance to *Papaya ringspot virus* (PRSV), GVA strain and E_2 strain

For GVA strain:	
[1] Susceptible: Védrantais (**Prv**$^{+}$ ~~Prsv~~$^{+}$)	Mosaic (vein-clearing)
[9] Resistant: 72025 (**Prv**^{2} ~~Prsv~~^{2})	- No systemic symptoms - Irregular local necrotic lesions on cotyledons
[9] Resistant: WMR~~V~~ 29 (**Prv**^{1} ~~Prsv~~^{1})	- No systemic symptoms - Occasional local necrotic lesions on cotyledons

For E_2 strain:	
[1] Susceptible: Védrantais (**Prv**$^{+}$ ~~Prsv~~$^{+}$)	Mosaic (vein-clearing)
[1] Susceptible: 72025 (**Prv**^{2} ~~Prsv~~^{2})	- Apical necrosis - Necrosis of plant instead of local lesions
[9] Resistant: WMR~~V~~ 29 (**Prv**^{1} ~~Prsv~~^{1})	- No systemic symptoms - Occasional local necrotic lesions on cotyledons

ISF – F48: The official name of the gene is **Prv**, not Prsv
NL: When companies **claim resistance to PRSV**, does this means resistance to **E2** or **GVA**?
Are there any examples of **commercial varieties** with the same phenotype as **line 72025**?
If no examples can be given, what is the relevance of keeping this characteristic?

- No claims known in NL applications.

FR proposal
To correct the name of the gene : Prv and not Prsv

Ad. 75: Resistance to *Melon necrotics spot virus* (MNSV), E_8 strain

11.2 Observation scale .....
.....**[1] Susceptible**: Védrantais — Necrotic lesions on the inoculated organs, systemic reaction, death of plant
.....

ISF – F49: "Necrotic lesions on the inoculated organs": This is the most important trait
ISF – F50: "systemic reaction, death of plant": This is **not a good criteria** : systemic reaction depends on conditions, and also on varieties.
FR proposal

11.2 Observation scale .....
.....**[1] Susceptible**: Védrantais — **Necrotic lesions on the inoculated organs**, systemic reaction (depends on conditions, and also on varieties), death of plant
.....

Ad. 76: Resistance to Cucumber mosaic virus (CMV)

5. Isolate ..... Use "common" strains (as T1, P9) rather than "song" strains (14, T2).

8.5 Inoculation method ..... Inoculation by rubbing. After a few minutes, rinse the cotyledons with running water.
ISF – F51: "After a few minutes, rinse the cotyledons with running water": Optional
FR proposal
Inoculation by rubbing. Optional: After a few minutes, rinse the cotyledons with running water.

8.6 Harvest of inoculums ..... symptomatic leaves, e.g.: 1g leaves with 4mL buffer - 0,03 M PBS with 0,2% DIECA freshly added
ISF – F52: Important for CMV : addition of activated charcoal
FR proposal symptomatic leaves, e.g.: 1g leaves with 4mL buffer - 0,03 M PBS with 0,2% DIECA freshly added (addition of activated charcoal)

9.3 Control varieties..... Védrantais, 72025, WMRV, Virgos, PI 161375
ISF – F53 "WMRV": what is this ?
FR proposal
Mistyping – to delete

9.5 Test facility ..... Climatic room or glasshouse
ISF – s54: Greenhouse?
FR answer
I don't identify a difference of meaning between the

9.8 Season..... all seasons
ISF – F55: strong environmental effect on test severity. In GH, more severe in winter, too soft in summertime.
FR proposal
Remark to include.

10.1 Preparation inoculums ..... Fresh leaves homogenized in ice-cold buffer solution- in PBS and carborundum
ISF – F56
FR proposal
Fresh leaves homogenized in ice-cold buffer solution- in PBS and carborundum (active charcoal), with 0.2% DIECA freshly added

10.4 Inoculation method ..... Inoculation by rubbing.
..... Optional : After a few minutes, rinse the cotyledons with running water.
ISF – F57: "Optional : After a few minutes, rinse the cotyledons with running water", especially when one uses activated charcoal.
FR proposal
Optional: After a few minutes, rinse the cotyledons with running water, especially when one uses activated charcoal

11.2 Observation scale .....
[…]
Remarks : ..... P9 strain brings out "aucuba" mosaic on susceptible varieties
P9 strain is less aggressive than T1 strain.

ISF – F58: Aucuba is strong symptom= more aggressive
ISF – F59: The term of "virulent" should be used here.
FR proposal
Remarks : P9 strain brings out strong symptoms ("aucuba" mosaic on susceptible varieties).
P9 strain is less virulent than T1 strain

Chapter 9 – Literature

NL: General remark: the literature list is extremely long. How to deal with this? Some guidance would be welcome.
FR proposal
To classify the articles according the key words, then the publication year?
To be discussed.

Chapter 10 - Technical Questionnaire

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?

7.1.1. Varietal type or cultigroup :

(ES) The additional information about **type of varieties** was discussed when the last version of the TG was agreed. It was France who proposed not to include it because it exist a lot of different types around the world. As it is **not the objective of this partial revision**, I should delete the paragraph 7.1.1. that would need **a longer discussion**.
FR proposal
I agree, it is not the objective of this partial revision. It could be the base of a next discussion.

- Literature to consult to prepare this discussion:

- OECD publication

International Standards for Fruit and Vegetables - Melons

ISSN :1993-5668 (online)
ISSN :1011-0518 (print)
DOI :10.1787/19935668

English/French
OECD
Publication Date :30 May 2006
Pages :96
ISBN :9789264022553 (PDF) ; 9789264022546 (print)
DOI :10.1787/9789264022553-en-fr

This book provides comments and illustrations to facilitate the common interpretation of the standard in force for grading melons in international trade under the Scheme for the Application of International Standards for Fruit and Vegetables set up by the OECD in 1962. It is therefore a valuable tool for both the Inspection Authorities and professional bodies responsible for the application of standards or those interested in international trade of melons.

-CTIFL publication:

RECONNAITRE LES TYPES COMMERCIAUX DE MELONS ET DE PASTEQUES

Philippe MENTION (Ctifl) - Valentine COTTET (Ctifl)

Ils s'appellent Canari, Charentais jaune ou vert, Galia, Honeydew, mais aussi Sugar Baby, Asiatique... Pour permettre de mieux les connaître, le Ctifl publie ce fascicule à l'usage de toute la filière dans une approche distribution du produit. Vingt-huit types commerciaux de melons et sept types commerciaux de pastèques présents sur le marché européen, à des volumes plus ou moins importants sont décrits.
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Réf. : 33008 - Janvier 2011 - **29 €**
203 pages - Format : 10 X 16
ISBN : 9782879113043

7.1.2. Additional Disease resistance characteristics

Qualitative traits

Resistance to	absent	present	not tested	Char
Fusarium oxysporum f. sp. *melonis*, Race 1-2				69.4

ISF – F60: Again, this is not a qualitative trait. Should be in the other table.
FR proposal
FR agree.

Zucchini yellow mosaic virus (ZYMV), F strain				73

ISF – F61: Again, what is absent/present?

- Is it *Fn* or is it *Zym* ?

Fn is not a resistance. If *Zym* only is looked for, a NF strain can be used.
FR proposal
Use of a strain F or strain NF to be discussed. The **use of a strain F** (eg: 1318) is more informative. With the same pathological test, we can have information about the state of the gene Zym and, if it is absent, to have information on the state of the gene Fn.

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

Type of culture

FR proposal
This section is not highly informative. **To delete?**

7.3 Other information

A **representative color photograph** of the variety (fruit) should accompany the Technical Questionnaire.

(ES) The **inclusion of photos** requested in the paragraph 7.3.of the TQ make the 7.1.1 **unnecessary**.
FR proposal
We don't agree.
We support the interest of the picture of the fruit as long as the discussion of the types of varieties will not be achieved. To be associated to the discussion on the definition of the the cultigroups.

[End of Annex and of document]