

Technical Working Party for Vegetables

TWV/56/7

Fifty-Sixth Session

Virtual meeting, April 18 to 22, 2022

Original: English

Date: March 7, 2022

PARTIAL REVISION OF THE TEST GUIDELINES FOR SPINACH

Document prepared by an expert from the Netherlands

Disclaimer: this document does not represent UPOV policies or guidance

1. The purpose of this document is to present a proposal for a partial revision of the Test Guidelines for Spinach (document TG/55/7 Rev.6).
2. The Technical Working Party for Vegetables (TWV), at its fifty-fifth session hosted by Turkey and organized by electronic means, from May 3 to 7, 2021, agreed that the Test Guidelines for Spinach (document TG/55/7 Rev.6) be partially revised for Characteristic and Ad. 18 "Resistance to *Peronospora farinosa* f. sp. *spinaciae*" (see document TWV/55/16 "Report", Annex III).
3. The following changes are proposed:
 - (a) Change of the name of Char. 18 from "*Peronospora farinosa* f. sp. *spinaciae* (Pfs)" to "*Peronospora effusa* (Pe) (ex *Peronospora farinosa* f. sp. *spinaciae*)" and change of the name of the races from "Race Pfs:(space)'race number'" to "Pe:(space)'race number'"
 - (b) Addition of two new races to Characteristic 18:
 - Characteristic 18.17: "Resistance to *Peronospora effusa* (Pe) (ex *Peronospora farinosa* f. sp. *spinaciae*) - Race Pe: 18";
 - Characteristic 18.18: "Resistance to *Peronospora effusa* (Pe) (ex *Peronospora farinosa* f. sp. *spinaciae*) - Race Pe: 19".
 - (c) Revision of explanation Ad. 18 in Chapter 8.2 "Explanations for individual characteristics"
 - (d) Update of Characteristic 18 in Chapter 10 "Technical Questionnaire" and moving information related to Characteristic 18 from Section TQ 7.3 "Other information" to Section TQ 5 "Characteristics of the variety to be indicated"
4. The proposed changes are presented below in highlight and underline (insertion) and ~~strikethrough~~ (deletion).

Proposal to change the header of Char. 18 from “*Peronospora farinosa* f. sp. *spinaciae* (Pfs)” to “*Peronospora effusa* (Pe) (ex *Peronospora farinosa* f. sp. *spinaciae*)” and change of the name of the Races from “Race Pfs:(space)‘race number’” to “Pe:(space)‘race number’”

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18. VG (+)	Resistance to <u><i>Peronospora farinosa</i> f. sp. <i>spinaciae</i> (Pfs)</u> <u><i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>	Résistance à <u><i>Peronospora farinosa</i> f. sp. <i>spinaciae</i> (Pfs)</u> <u><i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>	Resistenz gegen <u><i>Peronospora farinosa</i> f. sp. <i>spinaciae</i> (Pfs)</u> <u><i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>	Resistencia a <u><i>Peronospora farinosa</i> f. sp. <i>spinaciae</i> (Pfs)</u> <u><i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>		
18.1	Race Pfs Pe: 1	Race Pfs Pe: 1	Pathotyp Pfs Pe: 1	Raza Pfs Pe: 1		
QL	absent	absente	fehlend	ausente	Viroflay, Winterreuzen	1
	present	présente	vorhanden	presente	Califlay, Resistoflay	9
18.2	Race Pfs Pe: 2	Race Pfs Pe: 2	Pathotyp Pfs Pe: 2	Raza Pfs Pe: 2		
QL	absent	absente	fehlend	ausente	Califlay	1
	present	présente	vorhanden	presente	Resistoflay	9
18.3	Race Pfs Pe: 3	Race Pfs Pe: 3	Pathotyp Pfs Pe: 3	Raza Pfs Pe: 3		
QL	absent	absente	fehlend	ausente	Resistoflay	1
	present	présente	vorhanden	presente	Califlay, Clermont	9
18.4	Race Pfs Pe: 4	Race Pfs Pe: 4	Pathotyp Pfs Pe: 4	Raza Pfs Pe: 4		
QL	absent	absente	fehlend	ausente	Califlay	1
	present	présente	vorhanden	presente	Clermont	9
18.5	Race Pfs Pe: 5	Race Pfs Pe: 5	Pathotyp Pfs Pe: 5	Raza Pfs Pe: 5		
QL	absent	absente	fehlend	ausente	Clermont	1
	present	présente	vorhanden	presente	Califlay, Campania	9
18.6	Race Pfs Pe: 6	Race Pfs Pe: 6	Pathotyp Pfs Pe: 6	Raza Pfs Pe: 6		
QL	absent	absente	fehlend	ausente	Califlay, Campania	1
	present	présente	vorhanden	presente	Boeing	9
18.7	Race Pfs Pe: 7	Race Pfs Pe: 7	Pathotyp Pfs Pe: 7	Raza Pfs Pe: 7		
QL	absent	absente	fehlend	ausente	Califlay	1
	present	présente	vorhanden	presente	Campania	9

	English	français	Deutsch	español	Example Varieties Exemples Beispielssorten Variedades ejemplo	Note/ Nota
18.8	Race Pfs Pe: 8	Race Pfs Pe: 8	Pathotyp Pfs Pe: 8	Raza Pfs Pe: 8		
QL	absent	absente	fehlend	ausente	Boeing, Campania	1
	present	présente	vorhanden	presente	Lazio, Lion	9
	-----	-----	-----	-----	-----	-----
18.9	Race Pfs Pe: 10	Race Pfs Pe: 10	Pathotyp Pfs Pe:10	Raza Pfs Pe:10		
QL	absent	absente	fehlend	ausente	Boeing, Campania, Lion	1
	present	présente	vorhanden	presente	Lazio	9
	-----	-----	-----	-----	-----	-----
18.10	Race Pfs Pe: 11	Race Pfs Pe: 11	Pathotyp Pfs Pe: 11	Raza Pfs Pe: 11		
QL	absent	absente	fehlend	ausente	Lazio	1
	present	présente	vorhanden	presente	Boeing, Califlay, Campania, Lion	9
	-----	-----	-----	-----	-----	-----
18.11	Race Pfs Pe: 12	Race Pfs Pe: 12	Pathotyp Pfs Pe: 12	Raza Pfs Pe: 12		
QL	absent	absente	fehlend	ausente	Boeing, Campania	1
	present	présente	vorhanden	presente	Finch, Pigeon, Red Kitten, Zebu	9
	-----	-----	-----	-----	-----	-----
18.12	Race Pfs Pe: 13	Race Pfs Pe: 13	Pathotyp Pfs Pe: 13	Raza Pfs Pe: 13		
QL	absent	absente	fehlend	ausente	Campania	1
	present	présente	vorhanden	presente	Boeing, Lion	9
	-----	-----	-----	-----	-----	-----
18.13	Race Pfs Pe: 14	Race Pfs Pe: 14	Pathotyp Pfs Pe: 14	Raza Pfs Pe: 14		
QL	absent	absente	fehlend	ausente	Campania, Pigeon	1
	present	présente	vorhanden	presente	Califlay, Lion	9
	-----	-----	-----	-----	-----	-----
18.14	Race Pfs Pe: 15	Race Pfs Pe: 15	Pathotyp Pfs Pe: 15	Raza Pfs Pe: 15		
QL	absent	absente	fehlend	ausente	Caladonia	1
	present	présente	vorhanden	presente	Pigeon	9
	-----	-----	-----	-----	-----	-----
18.15	Race Pfs Pe: 16	Race Pfs Pe: 16	Pathotyp Pfs Pe: 16	Raza Pfs Pe: 16		
QL	absent	absente	fehlend	ausente	Meerkat	1
	present	présente	vorhanden	presente	Caladonia	9
	-----	-----	-----	-----	-----	-----
18.16	Race Pfs Pe: 17	Race Pfs Pe: 17	Pathotyp Pfs Pe: 17	Raza Pfs Pe: 17		
QL	absent	absente	fehlend	ausente	Pigeon	1
	present	présente	vorhanden	presente	Hydrus	9

Proposal to add new races "Pe: 18" and "Pe: 19"

18.17	<u>Race Pe: 18</u>					
QL	<u>absent</u>				<u>Caladonia, Meerkat</u>	<u>1</u>
	<u>present</u>				<u>Hydrus</u>	<u>9</u>
18.18	<u>Race Pe: 19</u>					
QL	<u>absent</u>				<u>Hydrus, Meerkat</u>	<u>1</u>
	<u>present</u>				<u>Caladonia</u>	<u>9</u>

Revision of explanation Ad. 18 in Chapter 8.2 "Explanations for individual characteristics"

Current wording

Maintenance of races

Type of medium: Living host plants, obtainable from:
Naktuinbouw
P.O. Box 40
NL-2370 AA Roelofarendsveen
Netherlands
www.naktuinbouw.com
or plant material with spores stored at -20° C for a maximum of one year

Execution of test

Growth stage of plants: First cotyledons/leaf, eleven-day-old plants

Temperature: 15°C during day/12°C during night

Light: 15 hours per day, after emergence

Growing method: In soil in pots or trays in a glasshouse or growth chamber

Method of inoculation: Sporulating leaves, taken from host plants that were infected seven days before, are thoroughly rinsed with sterile tap water (maximum 150 ml water per 224 plants). The spore suspension is filtered through cheesecloth and sprayed on test plants until the inoculum covers the leaves but does not run off. 150 ml of suspension is enough for up to 3 x 224 plants. Spore density should be 20,000 to 100,000 conidia/ml water. The spore suspension should be used fresh.

Remarks: Spinach downy mildew is wind-borne. Sporulating plants should be kept in closed containers or isolated chambers to prevent any cross-contamination. Resistant controls are needed in each multiplication and in each test to ensure the race identity.

Light and humidity conditions during seedling development and incubation are critical. Optimal humidity of approximately 80-90% RH allows plant growth and fungal growth; strong light inhibits spore germination and infection.

The test should be carried out in wintertime with protection against direct sunshine. After inoculation, the plants should remain under plastic for three days. After this time, the plastic should be slightly raised during the daytime.

Duration of test

- Multiplication harvest spores 7 days after inoculation
- Sowing to inoculation: 11 days
- Inoculation to reading: 10 days

Number of plants tested at least 20 plants

Evaluation of infection: Resistance is usually complete; sometimes necrotic spots are visible as a result of infection. Some varieties may have a slightly lower level of resistance, showing for example a slight tip sporulation. In the table this is/these varieties are indicated by (R).
Susceptible plants show varying degrees of sporulation. Sporulation is visible as a grey covering on leaves, starting on the more humid abaxial side.

Disease resistance reactions of spinach downy mildew races on differentials of the International Working Group on *Peronospora* (IWGP)

Races Pfs: 1-8 and 10-17 of *Peronospora farinosa* f. sp. *spinaciae* are defined with a standard set of differentials according to the following table:

Differentials and isolates are available at Naktuinbouw:

Naktuinbouw
P.O. Box 40
NL-2370 AA Roelofarendsveen
Netherlands
www.naktuinbouw.com

Race - Pfs:																
Differentials	1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17
Viroflay	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
NIL 5	R	R	S	S	S	S	S	S	S	S	S	S	S	S	S	S
NIL 3	R	S	R	S	R	S	S	R	S	R	R	S	R	S	R	S
NIL 4	R	R	R	R	S	S	S	S	S	S	S	S	S	R	S	S
NIL 6	R	S	R	R	R	S	R	S	S	R	S	(R)	S	R	R	S
NIL 1	R	R	R	R	R	R	R	S	S	R	S	R	S	R	R	S
Whale	R	R	R	(R)	R	(R)	(R)	R	(R)	R	R	S	R	(R)	R	S
Pigeon	R	R	R	R	R	R	R	R	R	R	R	R	S	R	S	S
Caladonia	R	R	R	R	R	R	R	R	R	R	R	R	R	S	R	S
Meerkat	R	R	R	R	R	R	R	R	R	R	R	R	R	R	S	(R)
Hydrus	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R

Legend: S = susceptible, R or (R) = resistant

(Courtesy of ISF, table available under <http://www.worldseed.org>)

Proposed new wording

Ad. 18: Resistance to ~~*Peronospora farinosa* f. sp. *Spinaciae*~~ *Peronospora effusa* (Pe) (ex *Peronospora farinosa* f. sp. *spinaciae*)

Maintenance of races

Type of medium: Living host plants, obtainable from:
 Naktuinbouw
 P.O. Box 40
 NL-2370 AA Roelofarendsveen
 Netherlands
 www.naktuinbouw.com
 or plant material with spores stored at -20° C for a maximum of one year

Execution of test

Growth stage of plants: First cotyledons/leaf, eleven-day-old plants

Temperature: 15°C during day/12°C during night

Light: 15 hours per day, after emergence

Growing method: In soil in pots or trays in a glasshouse or growth chamber

Method of inoculation: Sporulating leaves, taken from host plants that were infected seven days before, are thoroughly rinsed with sterile tap water (maximum 150 ml water per 224 plants). The spore suspension is filtered through cheesecloth and sprayed on test plants until the inoculum covers the leaves but does not run off. 150 ml of suspension is enough for up to 3 x 224 plants. Spore density should be 20,000 to 100,000 conidia/ml water. The spore suspension should be used fresh.

Remarks: Spinach downy mildew is wind-borne. Sporulating plants should be kept in closed containers or isolated chambers to prevent any cross-contamination. Resistant controls are needed in each multiplication and in each test to ensure the race identity.

Light and humidity conditions during seedling development and incubation are critical. Optimal humidity of approximately 80-90% RH allows plant growth and fungal growth; strong light inhibits spore germination and infection.

The test should be carried out in wintertime with protection against direct sunshine. After inoculation, the plants should remain under plastic for three days. After this time, the plastic should be slightly raised during the daytime.

Duration of test

- Multiplication harvest spores 7 days after inoculation
 - Sowing to inoculation: 11 days
 - Inoculation to reading: 10 days

Number of plants tested at least 20 plants

Evaluation of infection: Resistance is usually complete; sometimes necrotic spots are visible as a result of infection. Some varieties may have a slightly lower level of

resistance, showing for example a slight tip sporulation. In the table this is/these varieties are indicated by (R).

Susceptible plants show varying degrees of sporulation. Sporulation is visible as a grey covering on leaves, starting on the more humid abaxial side.

Disease resistance reactions of spinach downy mildew races on differentials of the International Working Group on *Peronospora* (IWGP)

Races Pfs Pe: 1-8 and 10-17 19 of *Peronospora farinosa* f. sp. *spinaciae* *Peronospora effusa* (Pe) (ex *Peronospora farinosa* f. sp. *spinaciae*) are defined with a standard set of differentials according to the following table:

Differentials and isolates are available at Naktuinbouw:

Naktuinbouw
P.O. Box 40
NL-2370 AA Roelofarendsveen
Netherlands
www.naktuinbouw.com

Race — Pfs:																
Differentials	1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17
Viroflay	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
NIL 5	R	R	S	S	S	S	S	S	S	S	S	S	S	S	S	S
NIL 3	R	S	R	S	R	S	S	R	S	R	R	S	R	S	R	S
NIL 4	R	R	R	R	S	S	S	S	S	S	S	S	S	R	S	S
NIL 6	R	S	R	R	R	S	R	S	S	R	S	(R)	S	R	R	S
NIL 1	R	R	R	R	R	R	R	S	S	R	S	R	S	R	R	S
Whale	R	R	R	(R)	R	(R)	(R)	R	(R)	R	R	S	R	(R)	R	S
Pigeon	R	R	R	R	R	R	R	R	R	R	R	R	S	R	S	S
Caladonia	R	R	R	R	R	R	R	R	R	R	R	R	R	S	R	S
Meerkat	R	R	R	R	R	R	R	R	R	R	R	R	R	R	S	(R)
Hydrus	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R

Reaction patterns of <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) races on the IWGP spinach differential set																			
		Race Pe:																	
Differentials with ranking order		1	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17	18	19
V	Viroflay	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
1	NIL 5	R	R	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
2	NIL 3	R	S	R	S	R	S	S	R	S	R	R	S	R	S	R	S	S	R
3	NIL 4	R	R	R	R	S	S	S	S	S	S	S	S	S	R	S	S	S	S
4	NIL 6	R	S	R	R	R	S	R	S	S	R	S	(R)	S	R	R	S	R	S
5	NIL 1	R	R	R	R	R	R	R	S	S	R	S	R	S	R	R	S	R	S
6	NIL 2	R	R	R	R	R	R	R	R	R	S	S	S	S	R	S	S	S	S
7	Pigeon	R	R	R	R	R	R	R	R	R	R	R	R	S	R	S	S	S	S
8	Caladonia	R	R	R	R	R	R	R	R	R	R	R	R	R	S	R	S	S	R
9	Meerkat	R	R	R	R	R	R	R	R	R	R	R	R	R	R	S	(R)	S	S
10	Hydrus	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	S

Legend: S = susceptible, R or (R) = resistant

(Courtesy of ISF, table available under <http://www.worldseed.org>)

Update of Characteristic 18 in Chapter 10 “Technical Questionnaire” and moving information related to Characteristic 18 from Section TQ 7.3 “Other information” to Section TQ 5 “Characteristics of the variety to be indicated

Proposed removal of Characteristic 18 from Section TQ 7.3 “Other information”

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
-------------------------	-----------------	-------------------

#7. Additional information which may help in the examination of the variety

[...]

7.3 Other information

(a) Variety use:

- | | |
|--|-----|
| – only in glasshouse | [] |
| – only in the open | [] |
| – in the open <u>and</u> in glasshouse | [] |

(b) Resistance to pests and diseases (specify)

~~(i) Resistance to *Peronospora farinosa* f. sp. *spinaciae*~~

Race Pfs: 1	[]	absent	[]	present	[]	not tested
Race Pfs: 2	[]	absent	[]	present	[]	not tested
Race Pfs: 3	[]	absent	[]	present	[]	not tested
Race Pfs: 4	[]	absent	[]	present	[]	not tested
Race Pfs: 5	[]	absent	[]	present	[]	not tested
Race Pfs: 6	[]	absent	[]	present	[]	not tested
Race Pfs: 7	[]	absent	[]	present	[]	not tested
Race Pfs: 8	[]	absent	[]	present	[]	not tested
Race Pfs: 10	[]	absent	[]	present	[]	not tested
Race Pfs: 11	[]	absent	[]	present	[]	not tested
Race Pfs: 12	[]	absent	[]	present	[]	not tested
Race Pfs: 13	[]	absent	[]	present	[]	not tested
Race Pfs: 14	[]	absent	[]	present	[]	not tested
Race Pfs: 15	[]	absent	[]	present	[]	not tested
Race Pfs: 16	[]	absent	[]	present	[]	not tested
Race Pfs: 17	[]	absent	[]	present	[]	not tested

[...]

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

Proposed addition of Characteristic 18 to Section TQ 5 "Characteristics of the variety to be indicated"

5. This proposal should be considered in conjunction with the proposed partial revision of TQ 5 of the Test Guidelines for Spinach presented in document TWP/6/10, paragraph 23 and Annex IV.

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
Characteristics	Example Varieties	Note
[...]		
(18.1) <u>Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>		
<u>Race Pe: 1</u>		
<u>absent</u>	<u>Viroflay, Winterreuzen</u>	1 <input type="checkbox"/>
<u>present</u>	<u>Califlay, Resistoflay</u>	9 <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.2) <u>Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>		
<u>Race Pe: 2</u>		
<u>absent</u>	<u>Califlay</u>	1 <input type="checkbox"/>
<u>present</u>	<u>Resistoflay</u>	9 <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.3) <u>Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>		
<u>Race Pe: 3</u>		
<u>absent</u>	<u>Resistoflay</u>	1 <input type="checkbox"/>
<u>present</u>	<u>Califlay, Clermont</u>	9 <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.4) <u>Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>		
<u>Race Pe: 4</u>		
<u>absent</u>	<u>Califlay</u>	1 <input type="checkbox"/>
<u>present</u>	<u>Clermont</u>	9 <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.5) <u>Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>		
<u>Race Pe: 5</u>		
<u>absent</u>	<u>Clermont</u>	1 <input type="checkbox"/>
<u>present</u>	<u>Califlay, Campania</u>	9 <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
Characteristics	Example Varieties	Note
(18.6) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe: 6 <u>absent</u> <u>present</u> <u>not tested</u>	 <u>Califlay, Campania</u> <u>Boeing</u> 	 <u>1</u> <input type="checkbox"/> <u>9</u> <input type="checkbox"/> <u> </u> <input type="checkbox"/>
(18.7) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe: 7 <u>absent</u> <u>present</u> <u>not tested</u>	 <u>Califlay</u> <u>Campania</u> 	 <u>1</u> <input type="checkbox"/> <u>9</u> <input type="checkbox"/> <u> </u> <input type="checkbox"/>
(18.8) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe: 8 <u>absent</u> <u>present</u> <u>not tested</u>	 <u>Boeing, Campania</u> <u>Lazio, Lion</u> 	 <u>1</u> <input type="checkbox"/> <u>9</u> <input type="checkbox"/> <u> </u> <input type="checkbox"/>
(18.9) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe: 10 <u>absent</u> <u>present</u> <u>not tested</u>	 <u>Boeing, Campania, Lion</u> <u>Lazio</u> 	 <u>1</u> <input type="checkbox"/> <u>9</u> <input type="checkbox"/> <u> </u> <input type="checkbox"/>
(18.10) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe: 11 <u>absent</u> <u>present</u> <u>not tested</u>	 <u>Lazio</u> <u>Boeing, Califlay, Campania, Lion</u> 	 <u>1</u> <input type="checkbox"/> <u>9</u> <input type="checkbox"/> <u> </u> <input type="checkbox"/>

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
Characteristics	Example Varieties	Note
(18.11) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)		
Race Pe: 12		
<u>absent</u>	<u>Boeing, Campania</u>	1f <input type="checkbox"/>
<u>present</u>	<u>Finch, Pigeon, Red Kitten, Zebu</u>	9f <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.12) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)		
Race Pe: 13		
<u>absent</u>	<u>Campania</u>	1f <input type="checkbox"/>
<u>present</u>	<u>Boeing, Lion</u>	9f <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.13) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)		
Race Pe: 14		
<u>absent</u>	<u>Campania, Pigeon</u>	1f <input type="checkbox"/>
<u>present</u>	<u>Califlay, Lion</u>	9f <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.14) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)		
Race Pe: 15		
<u>absent</u>	<u>Caladonia</u>	1f <input type="checkbox"/>
<u>present</u>	<u>Pigeon</u>	9f <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.15) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)		
Race Pe: 16		
<u>absent</u>	<u>Meerkat</u>	1f <input type="checkbox"/>
<u>present</u>	<u>Caladonia</u>	9f <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>

TECHNICAL QUESTIONNAIRE	Page {x} of {y}	Reference Number:
-------------------------	-----------------	-------------------

Characteristics	Example Varieties	Note
(18.16) <u>Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>		
<u>Race Pe: 17</u>		
<u>absent</u>	<u>Pigeon</u>	1 <input type="checkbox"/>
<u>present</u>	<u>Hydrus</u>	9 <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.17) <u>Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>		
<u>Race Pe: 18</u>		
<u>absent</u>	<u>Caladonia, Meerkat</u>	1 <input type="checkbox"/>
<u>present</u>	<u>Hydrus</u>	9 <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
(18.18) <u>Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>)</u>		
<u>Race Pe: 19</u>		
<u>absent</u>	<u>Hydrus, Meerkat</u>	1 <input type="checkbox"/>
<u>present</u>	<u>Caladonia</u>	9 <input type="checkbox"/>
<u>not tested</u>		<input type="checkbox"/>
[...]		

[End of document]