

Technical Committee

TC/59/22

Fifty-Ninth Session
Geneva, October 23 and 24, 2023

Original: English
Date: September 28, 2023

PARTIAL REVISION OF THE TEST GUIDELINES FOR SPINACH

Document prepared by an expert from the Netherlands

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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. 7).

2. The Technical Working Party for Vegetables (TWV), at its fifty-seventh session¹, considered a proposal for a partial revision of the Test Guidelines for Spinach (*Spinacea oleracea* L.) on the basis of documents TG/55/7 Rev. 7 and TWV/57/11 "Partial revision of the Test Guidelines for Spinach" and proposed the following changes (see document TWV/57/26 "Report", paragraph 73):

- (a) Revision of characteristic and explanation 17 "Seed: spines (harvested seed)"
- (b) Inclusion of characteristics from the Table of Characteristics in the Technical Questionnaire

3. The proposed new wording is presented below. The proposed changes are presented in highlight and underline (insertion) and ~~strike through~~ (deletion) in the Annex to this document (in English only).

Proposed revision of Characteristic 17 "Seed: spines (harvested seed)"

| | English | français | Deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
|-------------------|--|--|---|--|--|---------------|
| 17. VG (+) | Plants: shape of pseudo fruit | Plante : forme du pseudo-fruit | Pflanze : Form der Pseudofrucht | Planta: forma del pseudofruto | | |
| QN | only plants with round pseudo fruits | seulement plantes à pseudo-fruits ronds | nur Pflanzen mit runden Pseudofrüchten | sólo plantas con pseudofrutos redondos | Hudson, Resistoflay | 1 |
| | plants with round pseudo fruits and plants with spined pseudo fruits | plantes à pseudo-fruits ronds et plantes à pseudo-fruits épineux | Pflanzen mit runden Pseudofrüchten und Pflanzen mit dornigen Pseudofrüchten | plantas con pseudofrutos redondos y plantas con pseudofrutos espinosos | Baboon, Quinto | 2 |
| | only plants with spined pseudo fruits | seulement plantes à pseudo-fruits épineux | nur Pflanzen mit dornigen Pseudofrüchten | sólo plantas con pseudofrutos espinosos | Anlani, Breedblad Scherpzaad | 3 |

¹ held in Antalya, Türkiye, from May 1 to 5, 2023

Proposed revision of explanation Ad. 17 "Seed: spines (harvested seed)"Ad. 17: Plants: shape of pseudo fruit

The segregation of varieties with state of expression 2 (both plants with round pseudo fruits as well as plants with spined pseudo fruits) is a consequence of the fatherline used for the production of hybrids which is homogenic but heterozygous for the shape of the pseudo fruit. This line is propagated by crossing and selection to keep it heterozygous for this trait. The reason for this is to protect certain valuable traits.



round pseudo fruit



spined pseudo fruit

The pseudo fruits to be assessed are developing on the plants grown of the submitted seed. The tissue of these pseudo fruits is the same as and thus part of the F1 plant. The F2 seed, enclosed by this pseudo fruit is not subject to observation.

Observations should be made on the plant when the pseudo fruits are fully developed, on female and monoecious plants. Varieties may consist of only plants with round pseudo fruits (note 1), only plants with spined pseudo fruits (note 3) or of both plants with round pseudo fruits as well as plants with spined pseudo fruits (note 2).

Proposed inclusion of characteristics from the Table of Characteristics in the Technical Questionnaire

4. The TWV is invited to consider the inclusion of the following characteristics in the TQ (characteristics for inclusion indicated in highlight and underline):

| Char. No. | (*) | Characteristic Name |
|-----------|-----|---|
| 1 | | <u>Seedling: length of cotyledon</u> |
| 2 | (*) | <u>Leaf: anthocyanin coloration of petioles and veins</u> |
| 3 | (*) | Leaf blade: intensity of green color |
| 4 | (*) | Leaf blade: blistering |
| 7 | | <u>Petiole: length</u> |
| 9 | (*) | <u>Leaf blade: shape (excluding basal lobes)</u> |
| 11 | (*) | Leaf blade: shape of apex |
| 13 | (*) | Proportion of monoecious plants |
| 14 | (*) | Proportion of female plants |
| 15 | (*) | Proportion of male plants |
| 16 | (*) | Time of start of bolting (for spring sown crops, 15% of plants) |
| 18.1 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 1 |
| 18.2 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 2 |
| 18.3 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 3 |
| 18.4 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 4 |
| 18.5 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 5 |
| 18.6 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 6 |
| 18.7 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 7 |
| 18.8 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 8 |
| 18.9 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 10 |
| 18.10 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 11 |
| 18.11 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 12 |
| 18.12 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 13 |
| 18.13 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 14 |
| 18.14 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 15 |
| 18.15 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 16 |
| 18.16 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 17 |
| 18.17 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 18 |
| 18.18 | | Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 19 |
| 19 | | <u>Resistance to Cucumber mosaic virus (CMV)</u> |

5. The detailed changes to the TQ are presented in highlight and underline (insertion) and ~~strike through~~ (deletion) in the Annex to this document (in English only).

[Annex follows]

PROPOSED CHANGES PRESENTED IN HIGHLIGHT
(in English only)

Proposed revision of Characteristic 17 “Seed: spines (harvested seed)”

| | English | français | Deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
|---------------|--|--|---|---|--|---------------|
| 17. VG (+) | Seed: spines (harvested seed) Plants: shape of pseudo fruit | Semence : épines (grains récoltés) Plante : forme du pseudo-fruit | Samen: Stacheln (geernteter Samen) Pflanze : Form der Pseudofrucht | Semilla: espinas (semilla cosechada) Planta: forma del pseudofruto | | |
| QL QN | absent only plants with round pseudo fruits | absentes seulement plantes à pseudo-fruits ronds | fehlend nur Pflanzen mit runden Pseudofrüchten | ausentes sólo plantas con pseudofrutos redondos | Hudson, Resistoflay | 1 |
| | plants with round pseudo fruits and plants with spined pseudo fruits | plantes à pseudo-fruits ronds et plantes à pseudo-fruits épineux | Pflanzen mit runden Pseudofrüchten und Pflanzen mit dornigen Pseudofrüchten | plantas con pseudofrutos redondos y plantas con pseudofrutos espinosos | Baboon, Quinto | 2 |
| | present only plants with spined pseudo fruits | présentes seulement plantes à pseudo-fruits épineux | vorhanden nur Pflanzen mit dornigen Pseudofrüchten | presentes sólo plantas con pseudofrutos espinosos | Anlani, Breedblad Scherpzaad, Marimba | 9 3 |

Proposed revision of explanation Ad. 17 “Seed: spines (harvested seed)”

Ad. 17: Seed: spines (harvested seed) Plants: shape of pseudo fruit

The segregation of varieties with state of expression 2 (both plants with round pseudo fruits as well as plants with spined pseudo fruits) is a consequence of the fatherline used for the production of hybrids which is homogenic but heterozygous for the shape of the pseudo fruit. This line is propagated by crossing and selection to keep it heterozygous for this trait. The reason for this is to protect certain valuable traits.



1
absent
round pseudo fruit



9
present
spined pseudo fruit

The pseudo fruits to be assessed are developing on the plants grown of the submitted seed. The tissue of these pseudo fruits is the same as and thus part of the F1 plant. The F2 seed, enclosed by this pseudo fruit is not subject to observation.

Observations should be made on the plant when the pseudo fruits are fully developed, on female and monoecious plants. Varieties may consist of only plants with round pseudo fruits (note 1), only plants with spined pseudo fruits (note 3) or of both plants with round pseudo fruits as well as plants with spined pseudo fruits (note 2).

Proposed inclusion of characteristics from the Table of Characteristics in the Technical Questionnaire

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

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

| Characteristics | Example Varieties | Note |
|--|--------------------------------------|------|
| 5.1 (1) Seedling: length of cotyledon | | |
| very short | | 1[] |
| very short to short | | 2[] |
| short | Nores | 3[] |
| short to medium | | 4[] |
| medium | | 5[] |
| medium to long | | 6[] |
| long | Breedblad Scherpzaad, Resistoflay | 7[] |
| long to very long | | 8[] |
| very long | | 9[] |
| 5.2 (2) Leaf: anthocyanin coloration of petioles and veins | | |
| absent | Resistoflay, Nores | 1[] |
| present | Red Cardinal, Reddy | 2[] |
| 5.4.3 (3) Leaf blade: intensity of green color | | |
| very light | | 1[] |
| very light to light | | 2[] |
| light | Monet, Viroflay, Winterreuzen | 3[] |
| light to medium | | 4[] |
| medium | Butterflay, Monnopa | 5[] |
| medium to dark | | 6[] |
| dark | Imola, Lavewa, Nores | 7[] |
| dark to very dark | | 8[] |
| very dark | Lorelay, Mystic | 9[] |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: | |
|-----------------------------|--|----------------------------|------|
| Characteristics | | Example Varieties | Note |
| 5.2.4 (4) | Leaf blade: blistering | | |
| | absent or very weak | Matador | 1[] |
| | <u>very weak to weak</u> | | 2[] |
| | weak | Polka, Tarpy | 3[] |
| | <u>weak to medium</u> | | 4[] |
| | medium | Butterfly, Koala, Mystic | 5[] |
| | <u>medium to strong</u> | | 6[] |
| | strong | Giraffe, Rhythm | 7[] |
| | <u>strong to very strong</u> | | 8[] |
| | very strong | Menorca, Revolver | 9[] |
| 5.5 (7) | Petiole: length | | |
| | <u>very short</u> | | 1[] |
| | <u>very short to short</u> | | 2[] |
| | <u>short</u> | <u>Imola, Mystic</u> | 3[] |
| | <u>short to medium</u> | | 4[] |
| | <u>medium</u> | <u>Butterfly, Giraffe</u> | 5[] |
| | <u>medium to long</u> | | 6[] |
| | <u>long</u> | <u>Grappa, Resistoflay</u> | 7[] |
| | <u>long to very long</u> | | 8[] |
| | <u>very long</u> | | 9[] |
| 5.6 (9) | Leaf blade: shape (excluding basal lobes) | | |
| | <u>triangular</u> | <u>Grappa, Maracas</u> | 1[] |
| | <u>medium ovate</u> | <u>Lavewa, Resistoflay</u> | 2[] |
| | <u>broad ovate</u> | <u>Butterfly</u> | 3[] |
| | <u>medium elliptic</u> | | 4[] |
| | <u>broad elliptic</u> | <u>Nores</u> | 5[] |
| | <u>circular</u> | <u>Giraffe</u> | 6[] |
| 5.3.7 (11) | Leaf blade: shape of apex | | |
| | acute | Grappa, Rhythm | 1[] |
| | obtuse | Resistoflay | 2[] |
| | rounded | Imola, Nores | 3[] |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: |
|--|-------------------|-------------------|
| Characteristics | Example Varieties | Note |
| 5.4 8 Proportion of monoecious plants (13) | | |
| absent or very low | Medania | 1[] |
| <u>very low to low</u> | | <u>2[]</u> |
| low | Matador | 3[] |
| <u>low to medium</u> | | <u>4[]</u> |
| medium | Figo | 5[] |
| <u>medium to high</u> | | <u>6[]</u> |
| high | Giraffe, Lazio | 7[] |
| <u>high to very high</u> | | <u>8[]</u> |
| very high | Monnopa | 9[] |
| 5.5 9 Proportion of female plants (14) | | |
| absent or very low | Monnopa | 1[] |
| <u>very low to low</u> | | <u>2[]</u> |
| low | Giraffe | 3[] |
| <u>low to medium</u> | | <u>4[]</u> |
| medium | Figo, Medania | 5[] |
| <u>medium to high</u> | | <u>6[]</u> |
| high | Parrot | 7[] |
| <u>high to very high</u> | | <u>8[]</u> |
| very high | | 9[] |
| 5.6 10 Proportion of male plants (15) | | |
| absent or very low | Monnopa, Parrot | 1[] |
| <u>very low to low</u> | | <u>2[]</u> |
| low | | 3[] |
| <u>low to medium</u> | | <u>4[]</u> |
| medium | Medania | 5[] |
| <u>medium to high</u> | | <u>6[]</u> |
| high | | 7[] |
| <u>high to very high</u> | | <u>8[]</u> |
| very high | | 9[] |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: | |
|---|---------------------------|-------------------|--|
| Characteristics | Example Varieties | Note | |
| 5.7 11 Time of start of bolting (for spring sown crops, 15% of plants) (16) | | | |
| very early | Figo, Maracas | 1 [] | |
| <u>very early to early</u> | | <u>2 []</u> | |
| early | Bandola, Viroflay | 3 [] | |
| <u>early to medium</u> | | <u>4 []</u> | |
| medium | Matador, Monnopa | 5 [] | |
| <u>medium to late</u> | | <u>6 []</u> | |
| late | Grappa, Medania, Revolver | 7 [] | |
| <u>late to very late</u> | | <u>8 []</u> | |
| very late | Chica, Lavewa | 9 [] | |
| 5.8 12 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 1 (18.1) | | | |
| absent | Viroflay, Winterreuzen | 1 [] | |
| present | Califlay, Resistoflay | 9 [] | |
| not tested | | [] | |
| 5.9 13 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 2 (18.2) | | | |
| absent | Califlay | 1 [] | |
| present | Resistoflay | 9 [] | |
| not tested | | [] | |
| 5.10 14 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 3 (18.3) | | | |
| absent | Resistoflay | 1 [] | |
| present | Califlay, Clermont | 9 [] | |
| not tested | | [] | |
| 5.11 15 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 4 (18.4) | | | |
| absent | Califlay | 1 [] | |
| present | Clermont | 9 [] | |
| not tested | | [] | |

| TECHNICAL QUESTIONNAIRE | | Page {x} of {y} | Reference Number: |
|---|----------------------------------|-----------------|-------------------|
| Characteristics | Example Varieties | Note | |
| 5.12 16 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 5 (18.5) | | | |
| absent | Clermont | 1 [] | |
| present | Califlay, Campania | 9 [] | |
| not tested | | [] | |
| 5.13 17 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 6 (18.6) | | | |
| absent | Califlay, Campania | 1 [] | |
| present | Boeing | 9 [] | |
| not tested | | [] | |
| 5.14 18 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 7 (18.7) | | | |
| absent | Califlay | 1 [] | |
| present | Campania | 9 [] | |
| not tested | | [] | |
| 5.15 19 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 8 (18.8) | | | |
| absent | Boeing, Campania | 1 [] | |
| present | Lazio, Lion | 9 [] | |
| not tested | | [] | |
| 5.16 20 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 10 (18.9) | | | |
| absent | Boeing, Campania, Lion | 1 [] | |
| present | Lazio | 9 [] | |
| not tested | | [] | |
| 5.17 21 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 11 (18.10) | | | |
| absent | Lazio | 1 [] | |
| present | Boeing, Califlay, Campania, Lion | 9 [] | |
| not tested | | [] | |

| TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: | |
|---|---------------------------------|-------------------|--|
| Characteristics | Example Varieties | Note | |
| 5.18 22 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 12 (18.11) | | | |
| absent | Boeing, Campania | 1 [] | |
| present | Finch, Pigeon, Red Kitten, Zebu | 9 [] | |
| not tested | | [] | |
| 5.19 23 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 13 (18.12) | | | |
| absent | Campania | 1 [] | |
| present | Boeing, Lion | 9 [] | |
| not tested | | [] | |
| 5.20 24 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 14 (18.13) | | | |
| absent | Campania, Pigeon | 1 [] | |
| present | Califlay, Lion | 9 [] | |
| not tested | | [] | |
| 5.21 25 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 15 (18.14) | | | |
| absent | Caladonia | 1 [] | |
| present | Pigeon | 9 [] | |
| not tested | | [] | |
| 5.22 26 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 16 (18.15) | | | |
| absent | Meerkat | 1 [] | |
| present | Caladonia | 9 [] | |
| not tested | | [] | |
| 5.23 27 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 17 (18.16) | | | |
| absent | Pigeon | 1 [] | |
| present | Hydrus | 9 [] | |
| not tested | | [] | |
| 5.24 28 Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 18 (18.17) | | | |
| absent | Meerkat | 1 [] | |
| present | Caladonia | 9 [] | |
| not tested | | [] | |

| TECHNICAL QUESTIONNAIRE | | Page {x} of {y} | Reference Number: |
|--|-------------------|-----------------|-------------------|
| Characteristics | Example Varieties | Note | |
| 5.25 27 (18.18) Resistance to <i>Peronospora effusa</i> (Pe) (ex <i>Peronospora farinosa</i> f. sp. <i>spinaciae</i>) Race Pe (ex Pfs): 19 | | | |
| absent | Pigeon | 1 [] | |
| present | Hydrus | 9 [] | |
| not tested | | [] | |
| 5.28 (19) Resistance to Cucumber mosaic virus (CMV) | | | |
| absent | Polka | 1 [] | |
| present | Symphony | 9 [] | |
| not tested | | [] | |

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