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| International Union for the Protection of New Varieties of Plants |  |

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| Technical Committee  Fifty-Ninth Session  Geneva, October 23 and 24, 2023 | TC/59/18  Original: English  Date: September 21, 2023 |

Partial revision of the Test Guidelines for Lettuce

Document prepared by an expert from the Netherlands

Disclaimer: this document does not represent UPOV policies or guidance

The purpose of this document is to present a proposal for a partial revision of the Test Guidelines for Lettuce (document TG/13/11 Rev. 2).

The Technical Working Party for Vegetables (TWV), at its fifty-seventh session[[1]](#footnote-2), considered a proposal for a partial revision of the Test Guidelines for Lettuce (*Lactuca sativa* L.) on the basis of documents TG/13/11 Rev. 2 and TWV/57/12 “*Partial revision of the Test Guidelines for Lettuce*” and proposed the following changes (see document TWV/57/26 “*Report*”, paragraph 68):

1. Addition of “Resistance to *Bremia lactucae* (Bl) Isolate Bl: 36EU”, including example varieties;
2. Revision of explanation Ad. 38 to 52: Resistance to Bremia lactucae (Bl).
3. Inclusion of characteristics from the Table of Characteristics in the Technical Questionnaire

The proposed changes are presented below in highlight and underline (insertion) and ~~strikethrough~~ (deletion).

Proposed addition of “Resistance to *Bremia lactucae* (Bl) Isolate Bl: 36EU”

*Proposed addition*

|  |  | English | | français | | deutsch | español | Example Varieties Exemples Beispielssorten Variedades ejemplo | Note/ Nota |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **53.** |  | **QL** | **VG** | **(+)** |  |  | | | |
|  |  | |  | | --- | | **Resistance to *Bremia lactucae*(Bl)  Isolate Bl: 36EU** | | | |  | | --- | | **Résistance à *Bremia lactucae* (Bl)  Isolat Bl: 36EU** | | | |  | | --- | | **Resistenz gegen *Bremia lactucae* (Bl) Isolat Bl: 36EU** | | |  | | --- | | **Resistencia a *Bremia lactucae* (Bl) Aislado Bl: 36EU** | |  |  |
|  |  | absent | | absente | | fehlend | ausente | Bartoli, RYZ2164 | 1 |
|  |  | present | | présente | | vorhanden | presente | Design, Kibrille | 9 |

It is proposed to include the new characteristic 53 in Chapter 10 “Technical questionnaire”, Section 5 “Characteristics of the variety to be indicated”.

## Proposed revision of explanation Ad. 38 to 52 “Resistance to *Bremia lactucae* (Bl)”

Ad. 38 to ~~52~~ 53: Resistance to Bremia lactucae (Bl), several isolates

|  |  |  |
| --- | --- | --- |
| 1. | Pathogen | *Bremia lactucae* |
| 2. | Quarantine status | no |
| 3. | Host species | lettuce - *Lactuca sativa* L. |
| 4. | Source of inoculum | GEVES[[2]](#footnote-3) (FR) or Naktuinbouw[[3]](#footnote-4) (NL) |
| 5. | Isolate | Bl: 16EU,17EU, 20-27EU, 29-31EU, 33EU, 35EU, 36EU |
| 6. | Establishment isolate identity | test on differentials (see table below) |
| 7. | Establishment pathogenicity | test on susceptible varieties |
| 8. | Multiplication inoculum |  |
| 8.2 | Multiplication variety | susceptible variety, for example Green Towers.  ~~For higher isolates,~~ For isolates with a higher number than Bl: 16EU, a variety with defeated resistance may be preferable to keep the isolate fit. |
| 8.8 | Shelflife/viability inoculum | 2 hours at room temperature; 2 days in fridge |
| 9. | Format of the test |  |
| 9.1 | Number of plants per genotype | at least 20 |
| 9.2 | Number of replicates | - |
| 9.3 | Control varieties | (informative) differentials (see table below) |
| 9.4 | Test design | - |
| 9.5 | Test facility | climate room |
| 9.6 | Temperature | 15°C-18°C |
| 9.7 | Light | adequate for good plant growth; seedlings should not etiolate.  option: reduced light 24 hours after inoculation |
| 9.8 | Season | - |
| 9.9 | Special measures | plants may grow on wet blotting paper with or without a nutrient solution, on sand or on potting soil (see point 13).  high humidity (>90%) is essential for infection and sporulation. |
| 10. | Inoculation |  |
| 10.1 | Preparation inoculum | washing off from leaves by vigorous shaking in a closed container |
| 10.2 | Quantification inoculum | counting spores; spore density should be 3 x 104 - 1 x 105 |
| 10.3 | Plant stage at inoculation | cotyledon stage |
| 10.4 | Inoculation method | spraying till run-off.  option: reduced light 24 hours after inoculation |
| 10.5 | First observation | beginning of sporulation on susceptible varieties (around 7 days after inoculation) |
| 10.6 | Second observation | 3-4 days after first observation (around 10 days after inoculation) |
| 10.7 | Final observations | 14 days after inoculation  two of these three observations may be sufficient, the third notation is optional for observation of evolution of symptoms in case of doubt. the day of maximum sporulation should occur in this period. |
| 11. | Observations |  |
| 11.1 | Method | visual observation of sporulation and necrotic reaction to infection |
| 11.2 | Observation scale | resistant:  class 0 no sporulation, no necrosis  class 1 no sporulation, necrosis present  class 2 weak sporulation (much less than susceptible control) with necrosis  class 3 weak sporulation (less than susceptible control and not evolving between second and third observation) with necrosis  class 4 very sparse sporulation (not evolving between second and third observation) without necrosis  susceptible:  class 5 reduced sporulation (compared to susceptible control) without necrosis  class 6 normal sporulation without necrosis |
| 11.3 | Validation of test | on standards  in case of normal sporulation (same level as susceptible control) with necrosis another test on bigger plants or other substrate must be undertaken. |
| 12. | Interpretation of data in terms of UPOV characteristic states | class 0, 1, 2, 3 and 4: resistant  class 5 and 6: susceptible |
| 13. | Critical control points | reaction of standards (the infection pressure may vary between experiments, leading to slight differences in sporulation intensity); when the reactions are not clear the experiment should be repeated.  the sowing on soil can be used to see necrosis, but weak sporulation (much less than susceptible control) can appear; when testing on sand, spores can be confused with grains of sand.  in case of use of nutritive solution on blotting paper, a fungicide can be added to avoid contamination by saprophytes. |

For reference: The International Bremia Evaluation Board (IBEB) produces regular updates of the host differential reaction table. The most recent table is available through ISF at http://www.worldseed.org/our-work/plant-health/other-initiatives/ibeb/. Pictures for the observation scale are also provided.

Afbeelding met tekst, kruiswoordpuzzel

Automatisch gegenereerde beschrijving

Resistance is indicated with – or (-), susceptibility is indicated with + or (+). The brackets indicate a lower and sometimes variable level of expression of the phenotype.

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

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** | **Comments** |
| 1 | (\*) | Seed: color |  |
| 6 | (\*) | Leaf: number of divisions |  |
| 11 | (\*) | Leaf: anthocyanin coloration |  |
| 12 | (\*) | Leaf: hue of anthocyanin coloration |  |
| 13 |  | Leaf: area covered by anthocyanin coloration |  |
| 14 | (\*) | Leaf: color |  |
| 15 | (\*) | Leaf: intensity of green color |  |
| 34 |  | Only varieties with Plant: degree of overlapping of upper part of leaves: medium or strong: Time of harvest maturity |  |
| 35 | (\*) | Time of beginning of bolting |  |
| 38 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 16EU |  |
| 39 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 17EU |  |
| 40 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 20EU |  |
| 41 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 21EU |  |
| 42 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 22EU |  |
| 43 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 23EU |  |
| 44 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 24EU |  |
| 45 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 25EU |  |
| 46 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 26EU |  |
| 47 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 27EU |  |
| 48 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 29EU |  |
| 49 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 30EU |  |
| 50 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 31EU |  |
| 51 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 33EU |  |
| 52 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 35EU |  |
| 53 |  | Resistance to *Bremia lactucae* (Bl) Isolate Bl: 36EU |  |
| 54 |  | Resistance to Lettuce mosaic virus (LMV) Pathotype II |  |
| 55 |  | Resistance to *Nasonovia ribisnigri* (Nr) Biotype Nr: 0 |  |
| 56 |  | Resistance to Fusarium oxysporum f. sp. lactucae (Fol) Race 1 |  |

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| |  |  |  | | --- | --- | --- | | 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)** | | | |  | | --- | | **Seed: color** | |  |  |
|  | | |  | | --- | | white | | |  | | --- | | Verpia | | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | yellow | | |  | | --- | | Durango | | |  | | --- | | 2 [   ] | |
|  | | |  | | --- | | brown | | |  | | --- | | Oaklin | | |  | | --- | | 3 [   ] | |
|  | | |  | | --- | | black | | |  | | --- | | Kagraner Sommer 2 | | |  | | --- | | 4 [   ] | |
| **5.2 (6)** | | |  | | --- | | **Leaf: number of divisions** | |  |  |
|  | | absent or very few | Fiorella, Lollo rossa | |  | | --- | | 1 [   ] | |
|  | | very few to few |  | |  | | --- | | 2 [   ] | |
|  | | few | Curletta, Rodagio | |  | | --- | | 3 [   ] | |
|  | | few to medium |  | |  | | --- | | 4 [   ] | |
|  | | medium | Ezabel, Jadigon | |  | | --- | | 5 [   ] | |
|  | | medium to many |  | |  | | --- | | 6 [   ] | |
|  | | many | Expedition, Multired 54 | |  | | --- | | 7 [   ] | |
|  | | many to very many |  | |  | | --- | | 8 [   ] | |
|  | | very many | Excite, Ezfrill, Telex | |  | | --- | | 9 [   ] | |
| |  | | --- | | **5.3** |  |  | | --- | | **(11)** | | | |  | | --- | | **Leaf: anthocyanin coloration** | |  |  |
|  | | |  | | --- | | absent or very weak | | |  | | --- | | Clarion | | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | very weak to weak | | |  | | --- | |  | | |  | | --- | | 2 [   ] | |
|  | | |  | | --- | | weak | | |  | | --- | | Du bon jardinier | | |  | | --- | | 3 [   ] | |
|  | | |  | | --- | | weak to medium | | |  | | --- | |  | | |  | | --- | | 4 [   ] | |
|  | | |  | | --- | | medium | | |  | | --- | | Lollo rossa, Luana | | |  | | --- | | 5 [   ] | |
|  | | |  | | --- | | medium to strong | | |  | | --- | |  | | |  | | --- | | 6 [   ] | |
|  | | |  | | --- | | strong | | |  | | --- | | Merveille des quatre saisons | | |  | | --- | | 7 [   ] | |
|  | | |  | | --- | | strong to very strong | | |  | | --- | |  | | |  | | --- | | 8 [   ] | |
|  | | |  | | --- | | very strong | | |  | | --- | | Iride, Revolution | | |  | | --- | | 9 [   ] | |
| **5.4 (12)** | | |  | | --- | | **Leaf: hue of anthocyanin coloration** | |  |  |
|  | | reddish | Lollo rossa | |  | | --- | | 1 [   ] | |
|  | | purplish | Iride | |  | | --- | | 2 [   ] | |
|  | | brownish | Luana, Maravilla de Verano | |  | | --- | | 3 [   ] | |
|  | | Characteristics | Example Varieties | Note |
| **5.5 (13)** | | **Leaf: area covered by anthocyanin coloration** |  |  |
|  | | very small | Steirer Krauthauptel | |  | | --- | | 1 [   ] | |
|  | | very small to small |  | |  | | --- | | 2 [   ] | |
|  | | small | Diablo | |  | | --- | | 3 [   ] | |
|  | | small to medium |  | |  | | --- | | 4 [   ] | |
|  | | medium | Luana | |  | | --- | | 5 [   ] | |
|  | | medium to large |  | |  | | --- | | 6 [   ] | |
|  | | large | Merveille des quatre saisons | |  | | --- | | 7 [   ] | |
|  | | large to very large |  | |  | | --- | | 8 [   ] | |
|  | | very large | Bijou, Revolution | |  | | --- | | 9 [   ] | |
| **5.6 (14)** | | **Leaf: color** |  |  |
|  | | green | Verpia | |  | | --- | | 1 [   ] | |
|  | | yellowish green | Dorée de printemps | |  | | --- | | 2 [   ] | |
|  | | greyish green | Celtuce, Du bon jardinier | |  | | --- | | 3 [   ] | |
| |  | | --- | | **5.7** |  |  | | --- | | **(15)** | | | |  | | --- | | **Leaf: intensity of green color** | |  |  |
|  | | |  | | --- | | very light | | |  | | --- | |  | | |  | | --- | | 1 [   ] | |
|  | | |  | | --- | | very light to light | | |  | | --- | |  | | |  | | --- | | 2 [   ] | |
|  | | |  | | --- | | light | | |  | | --- | | Blonde maraîchère, Lollo Bionda | | |  | | --- | | 3 [   ] | |
|  | | |  | | --- | | light to medium | | |  | | --- | |  | | |  | | --- | | 4 [   ] | |
|  | | |  | | --- | | medium | | |  | | --- | | Aquarel, Clarion | | |  | | --- | | 5 [   ] | |
|  | | |  | | --- | | medium to dark | | |  | | --- | |  | | |  | | --- | | 6 [   ] | |
|  | | |  | | --- | | dark | | |  | | --- | | Expedition, Verpia | | |  | | --- | | 7 [   ] | |
|  | | |  | | --- | | dark to very dark | | |  | | --- | |  | | |  | | --- | | 8 [   ] | |
|  | | |  | | --- | | very dark | | |  | | --- | | Pascal, Verdetrix | | |  | | --- | | 9 [   ] | |
| **5.8 (34)** | | **Only varieties with Plant: degree of overlapping of upper part of leaves: medium or strong: Time of harvest maturity** |  |  |
|  | | very early | Gotte jaune d'or | |  | | --- | | 1 [   ] | |
|  | | very early to early |  | |  | | --- | | 2 [   ] | |
|  | | early | Pantlika, Sucrine | |  | | --- | | 3 [   ] | |
|  | | early to medium |  | |  | | --- | | 4 [   ] | |
|  | | medium | Clarion | |  | | --- | | 5 [   ] | |
|  | | medium to late |  | |  | | --- | | 6 [   ] | |
|  | | late | Blonde maraîchère, Calmar | |  | | --- | | 7 [   ] | |
|  | | late to very late |  | |  | | --- | | 8 [   ] | |
|  | | very late | El Toro, Pinokkio | 9 [   ] |

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| |  |  |  | | --- | --- | --- | | TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: | | | | | |
|  | | | | |
|  | Characteristics | Example Varieties | Note |
| |  | | --- | | **5.9** | | **(35)** | | |  | | --- | | **Time of beginning of bolting** | |  |  |
|  | |  | | --- | | very early | | |  | | --- | | Blonde à couper améliorée | | |  | | --- | | 1 [   ] | |
|  | |  | | --- | | very early to early | | |  | | --- | |  | | |  | | --- | | 2 [   ] | |
|  | |  | | --- | | early | | |  | | --- | | Gotte à graine blanche | | |  | | --- | | 3 [   ] | |
|  | |  | | --- | | early to medium | | |  | | --- | |  | | |  | | --- | | 4 [   ] | |
|  | |  | | --- | | medium | | |  | | --- | | Pantlika | | |  | | --- | | 5 [   ] | |
|  | |  | | --- | | medium to late | | |  | | --- | |  | | |  | | --- | | 6 [   ] | |
|  | |  | | --- | | late | | |  | | --- | | Hilde II | | |  | | --- | | 7 [   ] | |
|  | |  | | --- | | late to very late | | |  | | --- | |  | | |  | | --- | | 8 [   ] | |
|  | |  | | --- | | very late | | |  | | --- | | Erika, Roxette | | |  | | --- | | 9 [   ] | |
| **5.10 (38)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 16EU** | |  |  |
|  | absent | Green Towers | 1 [   ] |
|  | present | Argelès | 9 [   ] |
|  | not tested |  | [   ] |
| **5.11 (39)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 17EU** | |  |  |
|  | absent | Green Towers | 1 [   ] |
|  | present | Argelès | 9 [   ] |
|  | not tested |  | [   ] |
| **5.12 (40)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 20EU** | |  |  |
|  | absent | Green Towers | 1 [   ] |
|  | present | FrRsal-1 | 9 [   ] |
|  | not tested |  | [   ] |
| **5.13 (41)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 21EU** | |  |  |
|  | absent | Green Towers | 1 [   ] |
|  | present | Argelès, Colorado | 9 [   ] |
|  | not tested |  | [   ] |
| **5.14 (42)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 22EU** | |  |  |
|  | absent | Green Towers | 1 [   ] |
|  | present | FrRsal-1 | 9 [   ] |
|  | not tested |  | [   ] |
| **5.15 (43)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 23EU** | |  |  |
|  | absent | Green Towers | 1 [   ] |
|  | present | Colorado | 9 [   ] |
|  | not tested |  | [   ] |

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| |  |  |  | | --- | --- | --- | | TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: | | | | | |
|  | | | | |
|  | Characteristics | Example Varieties | Note |
| **5.16 (44)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 24EU** | |  |  |
|  | absent | Argelès, Colorado | 1 [   ] |
|  | present | Dandie, NunDm15, UCDm14 | 9 [   ] |
|  | not tested |  | [   ] |
| **5.17 (45)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 25EU** | |  |  |
|  | absent | Colorado | 1 [   ] |
|  | present | Argelès | 9 [   ] |
|  | not tested |  | [   ] |
| **5.18 (46)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 26EU** | |  |  |
|  | absent | Colorado | 1 [   ] |
|  | present | Balesta, Bedford | 9 [   ] |
|  | not tested |  | [   ] |
| **5.19 (47)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 27EU** | |  |  |
|  | absent | Balesta, Colorado | 1 [   ] |
|  | present | FrRsal-1 | 9 [   ] |
|  | not tested |  | [   ] |
| **5.20 (48)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 29EU** | |  |  |
|  | absent | Argelès | 1 [   ] |
|  | present | Balesta | 9 [   ] |
|  | not tested |  | [   ] |
| **5.21 (49)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 30EU** | |  |  |
|  | absent | Argelès, Colorado | 1 [   ] |
|  | present | Balesta | 9 [   ] |
|  | not tested |  | [   ] |
| **5.22 (50)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 31EU** | |  |  |
|  | absent | Colorado, RYZ910457 | 1 [   ] |
|  | present | Argelès, Balesta | 9 [   ] |
|  | not tested |  | [   ] |
| **5.23 (51)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 33EU** | |  |  |
|  | absent | Kibrille, RYZ2164 | 1 [   ] |
|  | present | RYZ910457 | 9 [   ] |
|  | not tested |  | [   ] |

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| |  |  |  | | --- | --- | --- | | TECHNICAL QUESTIONNAIRE | Page {x} of {y} | Reference Number: | | | | | |
|  | | | | |
|  | Characteristics | Example Varieties | Note |
| **5.24 (52)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 35EU** | |  |  |
|  | absent | Design, Kibrille | 1 [   ] |
|  | present | Bartoli | 9 [   ] |
|  | not tested |  | [   ] |
| **5.25 (53)** | |  | | --- | | **Resistance to *Bremia lactucae*(Bl) Isolate Bl: 36EU** | |  |  |
|  | absent | Bartoli, RYZ2164 | 1 [   ] |
|  | present | Design, Kibrille | 9 [   ] |
|  | not tested |  | [   ] |
| **5.26 (54)** | **Resistance to *Lettuce mosaic virus* (LMV) Pathotype II** |  |  |
|  | absent | Bijou, Hilde II, Sprinter, Sucrine | 1 [   ] |
|  | present | Capitan, Corsica | 9 [   ] |
|  | not tested |  | [   ] |
| **5.27 (55)** | |  | | --- | | **Resistance to *Nasonovia ribisnigri* (Nr) Biotype Nr: 0** | |  |  |
|  | absent | Abel, Green Towers, Nadine | 1 [   ] |
|  | present | Barcelona, Bedford, Dynamite, Silvinas | 9 [   ] |
|  | not tested |  | [   ] |
| **5.28 (56)** | **Resistance to *Fusarium oxysporum* f.sp. *lactucae* (Fol) Race 1** |  |  |
|  | susceptible | Cobham Green, Patriot | 1 [   ] |
|  | moderately resistant | Affic, Fuzila, Natexis | 2 [   ] |
|  | highly resistant | Costa Rica No. 4, Romasol | 3 [   ] |
|  | not tested |  | [   ] |

[End of document]

1. held in Antalya, Türkiye, from May 1 to 5, 2023 [↑](#footnote-ref-2)
2. matref@geves.fr [↑](#footnote-ref-3)
3. resistentie@naktuinbouw.nl [↑](#footnote-ref-4)