



### PPP Project Annual Report 2018

The PPP-projects that have been established under the direction of the top sectors must submit an annual report on their technical and financial progress. This format is to be used for reporting the technical progress. A separate format ('PPP final report') is available for PPP-projects that have been completed in 2018.

**The annual reports will be published in full on the websites of the TKIs/top sector, excluding the blocks 'Approval coordinator/consortium' and 'Planning and progress'. Please ensure that no confidential matters are left in the remaining blocks.**

The PPP Project Annual Reports must be submitted to the TKI's before March 1<sup>st</sup> 2019. For Wageningen Research this will be coordinated via a central point.

| General information                             |   |
|---|---|
| PPP number                                      | KV 1409-031   |
| Title   | Groene Veredeling - A multidisciplinary approach for damping-off resistance in spinach  |
| Theme   | Durable Plant Production  |
| Executive knowledge institution(s)              | Wageningen Plant Research/Plant Breeding  |
| Research project leader (name + e-mail address) | Olga Scholten<br><a href="mailto:Olga.scholten@wur.nl">Olga.scholten@wur.nl</a>   |
| Coordinator (on behalf of private parties)      | Jan de Visser & Johan Rijk, Pop Vriend Seeds BV   |
| Government contact person                       | Jan van Vliet, Marien Valstar & Leo Oprel   |
| Total project size (k€)                         | 1262  |
| Address projectwebsite                          | <b>Kennisonline</b> <a href="http://www.wur.nl/nl/project/A-multidisciplinary-approach-for-dampingoff-resistance-in-spinach-.htm">http://www.wur.nl/nl/project/A-multidisciplinary-approach-for-dampingoff-resistance-in-spinach-.htm</a> |
| Start date                                      | 03-04-2015  |
| End date  | 03-04-2021  |

### Approval coordinator/consortium

The annual report should be discussed with the coordinator/the consortium. The TKIs appreciate being informed of possible feedback on the annual report.

|   |   |
|---|---|
| The coordinator has assessed the annual report on behalf of the consortium: | <input checked="" type="checkbox"/> approved<br><input type="checkbox"/> rejected |
| Possible feedback on the annual report:                                     |   |

### Planning and progress (if there are changes to the project plan, please explain)

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| Is the PPP going according to plan?                                | Relating to the content, the project is according to the plan.                   |
| Have there been changes in the consortium/project partners?        | No   |
| Is there a delay and/or deferred delivery date?                    | Yes, the end date of the project needs to be delayed till the end of April 2021. |
| Are there any substantive bottlenecks? Provide a brief description | No   |

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| Are there any deviations from the projected budget? | No, budget is shifted over the years due to the delay. |
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| <p><b>Short content description/aim PPS</b></p> <p>What is going on and how is this project involved?<br/>What will be delivered by the project and what is the effect of this?</p>  |
| <p>Spinach is an important component of baby-leaf salads both in organic and conventional production systems. Non-chemically treated spinach seeds can suffer seriously from damping-off and root rot diseases. In the Europe as well as in the USA, <i>Pythium</i> species seem the most important pathogens. Variation in response to damping-off has been observed between cultivars, but also between seed lots of the same cultivar, and even within seed lots. Apart from problems with pathogens, breeders also experience that seed vigour plays a role. In this research project we combine scientific research of different disciplines, i.e. plant breeding, phytopathology and seed technology, to improve levels of resistance/tolerance to damping-off in spinach suitable both for organic as well as conventional agriculture.</p> |

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| <p><b>Results in 2018/ so far</b></p> <p>Give a short description of the high-lights and project deliverable in 2018 / so far</p>  |
| <ul style="list-style-type: none"> <li>▪ Pythium isolates were multiplied for use in bench tests to study pre-emergence damping-off and post-emergence damping-off. Leads were obtained for further research in 2019.</li> <li>▪ Result of experiments carried out in 2016 and 2017, in which seed vigour of small and large seeds, grown under different conditions of moisture, have been studied, are being used to write the first scientific paper, entitled "Oxygen availability to the spinach seed embryo is the main driver for seed germination".</li> <li>▪ The companies have contributed in-kind by the production of RIL populations. In the Netherlands, one population was multiplied from F3 to F4. The other three selected populations were sent to Japan and USA, for multiplication from F3 to F4 (1 in Japan and 1 in USA), and from F2 to F3 (in USA).</li> </ul> |

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|--|---------|----------------------|-------------------------|
| <b>Number of delivered products in 2018</b> ( <i>in an appendix, please provide the titles and/or description of the products or a link to the products on public websites</i> )   |         |                      |                         |
| Academic articles  | Reports | Articles in journals | Introductions/workshops |
|  |         |                      | 2                       |
| Titles/ description of the most important products in 2018 (5 at max) and their target group   |         |                      |                         |
| <ul style="list-style-type: none"> <li>▪ Magnée KJH, Groot SPC, Postma J, Lammerts van Bueren ET, Scholten OE (2018) A multidisciplinary approach to improve damping-off tolerance in spinach. International Spinach Conference Murcia, Spain, February 14-15, 2018, oral presentation.</li> <li>▪ Joeke Postma, Kim Magnée, Olga Scholten, Steven Groot, Edith Lammerts van Bueren (2018) Tolerantie tegen damping-off in spinazie, Onderzoekersdag Groene Veredeling, Wageningen, 13 december, oral presentation.</li> </ul> |         |                      |                         |

**Appendix: Names of the products or a link to the products on a public website including the link to the project summary on Kennisonline**

**Kennisonline** <http://www.wur.nl/nl/project/A-multidisciplinary-approach-for-dampingoff-resistance-in-spinach-.htm>

**Groene Veredeling** <http://www.groeneveredeling.nl/nl/groeneveredeling/Projecten/Lopende-projecten/Verminderen-van-damping-off-in-spinazie.htm>