



PPP Annual Report 2019

PPP projects which are under supervision of the "Topsectoren" must report annually on the scientific content and financial progress. This form is used to report the progress of the content of the project. PPP projects that finish in 2019 should make use of a different form: "PPP-final report."

The annual report will be published on the TKI / topsector website. Therefore, please ensure that there is no confidential information in the annual report.

The PPP-annual report must be sent, at the latest, by the 1st of March 2020 to the "TKI's": info@tkitu.nl or info@tki-agrifood.nl. For Wageningen Research, the report has to be sent to the "Topsector secretary" of your respective institute.

| General information | |
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| PPP-number | KV 1409-031 |
| Title | Groene Veredeling - A multidisciplinary approach for damping-off resistance in spinach |
| Theme | Durable Plant Production |
| Implementing institute | Wageningen UR |
| Project leader research (name + e-mail address) | Olga Scholten (olga.scholten@wur.nl) |
| Coordinator (on behalf of private partners) | Jan de Visser & Johan Rijk, Pop Vriend Seeds BV |
| Project-website address | 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 |
| Start date | 03-04-2015 |
| Final date | 03-04-2021 |

Approval by the coordinator of the consortium

The annual report must be discussed with the coordinator of the consortium. The "TKI's" appreciate additional comments concerning the annual report.

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| Assessment of the report by the coordinator on behalf of the consortium: | <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Not approved |
| Additional comments concerning the annual report: | |

Summary of the project

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| Problem definition | 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 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. |
| Project goals | In this research project we combine scientific research of different disciplines, i.e. plant breeding, phytopathology and seed technology, to |

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| | improve levels of resistance/tolerance to damping-off in spinach suitable for organic as well as conventional agriculture. |
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| Results | |
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| Planned results 2019 | Project meetings with partners Optimization of the pre-emergence test for variation in Pythium tolerance between spinach cultivars by WUR Multiplication of populations by the companies |
| Achieved results 2019 | Two meetings were held with all partners, in February and June. In addition, partners have regular e-mail contact to discuss details of projects or to share opinions. Result of experiments in which seed vigour of small and large seeds grown under different moisture conditions have been used to write and submit the first scientific paper, see below. Pythium isolates were multiplied for use in bench tests to study pre-emergence damping-off, which is seen as non-emergence of seeds in the field due to Pythium infection. For the development of screening assay, moisture and inoculum concentrations were optimized. Also, the set-up has been improved for phenotyping emergence more efficiently. Results showed that seed priming, seed pericarp and pericarp wash water affected damping-off of different cultivar seed lots. The PhD student contributed to three symposia and workshops with a poster. The companies have contributed in-kind by the production of RIL populations. |
| Planned results 2020 | Project meetings Identification of traits that contribute to the prevention of damping-off in spinach |

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| Deliverables/products in 2019 (provide the titles and /or a brief description of the products/deliverables or a link to a website.) |
| <u>Scientific articles:</u> Kim JH Magnée, Olga E Scholten, Joeke Postma, Edith T Lammerts van Bueren & Steven PC Groot. Sensitivity of spinach seed germination to high moisture levels is influenced by seed size and driven by oxygen availability. Paper submitted. |
| <u>External reports:</u> |
| <u>Articles in professional journals/magazines:</u> |
| <u>(Poster) presentations at workshops, seminars, or symposia.</u> <ul style="list-style-type: none"> ▪ Kim JH Magnée, Steven PC Groot, Joeke Postma, Edith T Lammerts van Bueren & Olga E Scholten. A multidisciplinary approach to improve damping-off tolerance of spinach. Annual Meeting Experimental Plant Sciences Lunteren, 8-9 April, Lunteren, The Netherlands, poster. ▪ Idem. Plant Breeding & Biotechnology symposium, 11-13 June, Wageningen, The Netherlands, speed talk & poster. ▪ Idem. International Society of Seed Science, 22-25 Sept, Volendam, The Netherlands, poster. |
| <u>TV/ radio / social media / newspaper:</u> |
| <u>Remaining deliverables (techniques, devices, methods, etc.):</u> |