



**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.*

<b>General information</b>	
PPP number	KV1605-045/TU-16002
Title	Transient Induction of Plant Regeneration
Theme	Better Plants for New Demands/ More and Better with Less
Executive knowledge institution(s)	Wageningen Plant Research
Research project leader (name + e-mail address)	Kim Boutilier; kim.boutilier@wur.nl
Coordinator (on behalf of private parties)	Xana Verweij
Government contact person	Annet Zweep
Total project size (k€)	832.896
Address project website	
Start date	01-01-2017
End date	14-08-2021

<b>Approval coordinator/consortium</b>	
<i>The annual report should be discussed with the coordinator/the consortium. The TKIs appreciate being informed of possible feedback on the annual report.</i>	
The coordinator has assessed the annual report on behalf of the consortium:	<input checked="" type="checkbox"/> approved <input type="checkbox"/> rejected
Possible feedback on the annual report:	

<b>Planning and progress (if there are changes to the project plan, please explain)</b>	
Is the PPP going according to plan?	yes
Have there been changes in the consortium/project partners?	no
Is there a delay and/or deferred delivery date?	no
Are there any substantive bottlenecks? Provide a brief description	no
Are there any deviations from the projected budget?	no

**Short content description/aim PPS**

What is going on and how is this project involved?

What will be delivered by the project and what is the effect of this?

This project will use knowledge on regeneration-inducing transcription factors (TFs) in combination with transient expression systems to provide novel tools for plant regeneration in crops. Three approaches will be used to transiently express regeneration-promoting TFs in plant cells:

1. Cell penetrating peptides (CPP) introduce purified TFs into to the cell;
2. A modified CRISPR-Cas9 system (dCas9) to increase endogenous TF gene expression or to knock-down expression of genes that negatively regulate these TFs; and
3. Small molecules that directly or indirectly boost TF gene expression.

In parallel, we will identify the DNA binding proteins that promote or repress expression of these TFs, which will provide concrete leads for the dCas9 and chemical screening approaches.

This project will deliver novel (and in some countries non-GMO) tools to promote *in vitro* regeneration processes, including clonal propagation through somatic embryogenesis and production of true-breeding lines through double-haploid production.

The participating companies will also gain (hands-on) experience with CRISPR-Cas system and chemical screening, two powerful techniques that are being rapidly implemented in fundamental and applied plant sciences. Finally, fundamental knowledge obtained from identification of proteins that regulate regeneration-promoting TFs will lead to the identification of new insight into the molecular-genetic control of plant regeneration.

**Results in 2018/ so far**

Give a short description of the high-lights and project deliverable in 2018 / so far

- The CRISPR-dCas9systems has been optimized for transient expression of regeneration TFs in tobacco leaves
- Candidate proteins that bind to the TF promoter sequences have been identified
- Deletion mutants are being made in the TF promoter sequences to identify enhancer and repressor elements that regulate TF gene expression

**Number of delivered products in 2018** (*in an appendix, please provide the titles and/or description of the products or a link to the products on public websites*)

Academic articles	Reports	Articles in journals	Introductions/workshops
0	0	0	0
Titles/ description of the most important products in 2018 (5 at max) and their target group			
Poster: Lena Maas 'Transient Induction of Plant Regeneration' . Advanced Course Transcription Factors and Transcriptional Regulation. Wageningen, 10-12 December 2018. Target group: PhD students and post-doctoral fellows.			

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