

1st TALEN & CRISPR Training School
Halle (Saale), Germany
24.03. - 28.03.2014

Final report



Summary: The aim of the Training School was to educate young researchers (PhD students and postdocs) in the highly novel and powerful genome editing technique to modify plant genomes. According to the COST initiative FA1208 this potentially GMO-free technique might allow generation of resistant crop varieties. The participation of a researcher from Bayer CropScience should support the "outreach" of the program to plant breeders. Two expert groups (Boch/GER, Kamoun/UK) in the COST consortium joined their expertise to teach the participants in the two leading genome editing techniques. In addition, the course included the powerful Golden Gate cloning technique which is highly useful to generate the required constructs as well as any other desired constructs. Five internationally renowned invited speakers presented their research and discussed with participants. Five local speakers provided the background information on genome editing in an accompanying lecture series.

Organizer: Dr. Jens Boch, Martin Luther University Halle-Wittenberg, Department of Genetics, Weinbergweg 10, Halle (Saale), Germany; jens.boch@genetik.uni-halle.de

Location: Biologikum, Martin Luther University Halle-Wittenberg, Department of Genetics, Weinbergweg 10, Halle (Saale), Germany

Teacher:

Dr. Jens Boch (MLU)

Dr. Vladimir Nekrasov (The Sainsbury Laboratory, Norwich, UK)

Dr. Montserrat Solé Castellví (MLU)

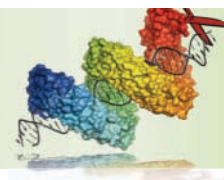
Sebastian Becker (MLU)

Maik Reschke (MLU)

Annekatri Richter (MLU)

Jana Streubel (MLU)

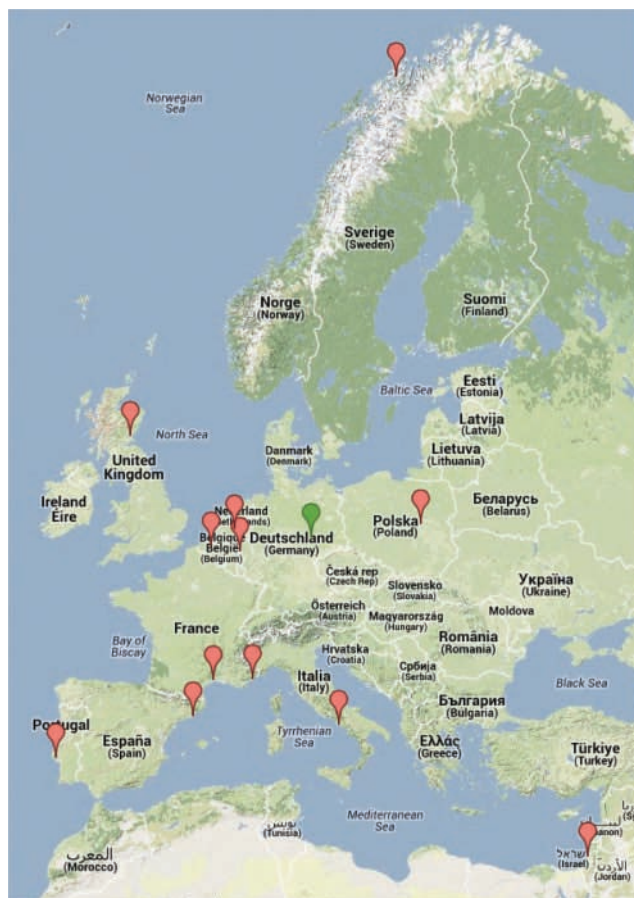
1st TALEN & CRISPR Training School
24.-28. March 2014
Halle (Saale), Germany



Participants:

17 participants (red label) from 11 countries attended the course in Halle (green label).

Nuno Almeida	Portugal
Servane Baufume	France
Eran Bosis	Israel
Emmanouil Domazakis	Netherland
Paolo Iovieno	Italy
Stefan Kusch	Germany
Tina Kyndt	Belgium
Haibin Lu	Spain
Sophie Mantelin	UK
Hazel McLellan	UK
Clemence Medina	France
Stian Olsen	Norway
Laurens Pauwels	Belgium
Waldek Skowron	Poland
Weronika Wituszynska	Poland
Mireille van Damme	Netherlands
Ilse van den Brande	Belgium



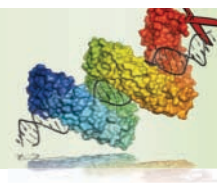
Program:

Lectures (invited):

Dr. Sylvestre Marillonnet	IPB Halle, Germany
<i>Golden Gate cloning and modular cloning for Assembly of TAL effectors and multigene constructs</i>	
Prof. Dr. Holger Puchta	KIT Karlsruhe, Germany
<i>Engineering of Plant Genomes by DSB Induction</i>	
Dr. Vladimir Nekrasov	TSL, Norwich, Germany
<i>From TALENs to CRISPR/Cas: problems and successes with genome editing technologies in plants</i>	
Prof. Dr. Emmanuelle Charpentier	HZI Braunschweig, Germany
<i>CRISPR-Cas9: from bacterial adaptive immunity to genome engineering</i>	
Dr. Patrick Schweizer	IPK Gatersleben, Germany
<i>New technologies for plant research and breeding – GM or not?</i>	

Lectures (local):

Jana Streubel	MLU Halle, Germany
<i>TALE RVD specificities & assembly kits</i>	
Maik Reschke	MLU Halle, Germany
<i>Design and variations of TALENs and CRISPRs</i>	
Annekatriin Richter	MLU Halle, Germany
<i>Target site selection for TALE proteins & CRISPR/Cas9</i>	



Dr. Jan Grau MLU Halle, Germany
Computational prediction of TALEN & CRISPR off-targets

Dr. Montserrat Solé Castellví MLU Halle, Germany
Delivery of TALENs/CRISPR-Cas9 constructs and in planta detection of genome editing

Experiments:

- A) Assembly of a pair of TALENs
- B) Cloning of sgRNA for CRISPR/Cas9
- C) Detection of TALEN & CRISPR activity
 - C1) *In vitro* transcription-translation
 - C2) *In vivo* GUS reporter reconstitution
 - C3) *In vivo* Surveyor assay
 - C4) *In vivo* PCR and restriction site polymorphism

Material:

The participants were supplied with the following material

- Protocol booklet
- USB-stick with digital data (program, literature, lectures)
- Training school bag and pen
- Vector libraries for construction of TALEN & CRISPR/Cas sgRNA
- Individually constructed TALEN and sgRNA

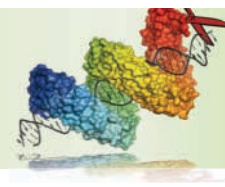
Financial support:

All participants received a COST travel grant of 1,100 € (300 € travel, 160 €/day).
 The participants supported the local expenses at MLU with 300 € per person.
 MLU received the local organizer support (LOS) of approx. 2,000 € from the COST FA1208 grant holder (INRA).

Expenses:

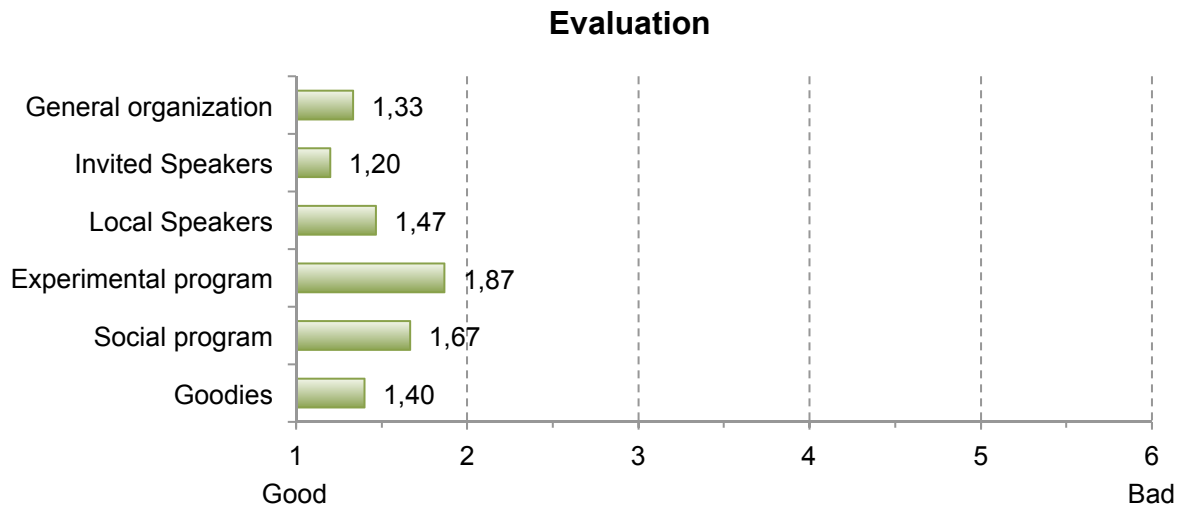
Expense	Detail	Cost
Program	Paper, foil, binding, digital material, printing	369,63 €
	Bag and material	175,11 €
Coffee breaks	Coffee, snacks, water, juice	459,54 €
	Cups, plates, paper towels	12,05 €
Networking meal		457,10 €
Laboratory consumables	Surveyor kit	330,00 €
	Oligos	198,19 €
	Restriction enzymes	157,86 €
	DNA minipreps, sequencing	120,52 €
Total		2.280,00 €

Additional expenses were covered by the participants via their contribution.



Evaluation:

This is the summary of an evaluation of the course from 15 participants.



Some comments:

"This was, without a doubt, the most inspiring workshop I have ever attended."

"I really enjoyed the different talks from the invited speakers but also from your PhD students"

"It was a great pleasure to have attended the TALEN and CRISPR/Cas school. Everything was organized in an exceptional way."

"Great speakers"