



# NEWSLETTER 2/2015

## ACTIVITIES

### CEPLAS Symposium 2015

On May 18/19 2015 the third CEPLAS Symposium on the genetic basis of plant complex traits took place at the Rautenstrauch-Joest-Museum in Cologne.

More than 150 national and international scientists participated in the

2-day event. The programme combined presentations in the areas of leaf structure and function, plant developmental genetics and genetic and metabolic plant-microbe interactions by faculty and young researchers as well as a poster session.



This year's symposium location: The Rautenstrauch-Joest-Museum on 'Cultures of the World' in Cologne.

Apart from the scientific symposium, members of the Scientific Advisory Board of CEPLAS were also present to get an overview of the development of the cluster's research and structural programme.

Based on interviews and discussions with research areas, new faculty, Postdocs and PhDs they summarised their impressions and recommendations in a reviewing report.



Poster session at the Symposium 2015

The report and further images of the symposium are available in the members section of our homepage.

[\[ceplas/symposium-2015\]](http://ceplas/symposium-2015)  
[\[www.ceplas.eu/en/login\]](http://www.ceplas.eu/en/login)

### Visit at the protected site for GMO field trials in Reckenholz, Switzerland

On May 13, a delegation of CEPLAS members, together with scientists from the Forschungszentrum Jülich and representatives from the Projektträger Jülich visited the

protected site Agroscope in Reckenholz Switzerland. The protected site was set-up to give researchers working with GMO the opportunity to perform experimental field trails in a protected site that prevents the destruction through vandalism.

cooperation.

[\[www.protectedsite.ch\]](http://www.protectedsite.ch)



The experimental site is protected by perimeter fencing, round-the-clock guarding and surveillance of the experimental field, and an alarm system.

The site is operated by Agroscope, the Swiss centre of excellence for agricultural research and is affiliated with the Federal Office for Agriculture (FOAG). Maintenance of the 3 ha field costs around 700.000 €/year.

The aim of the meeting was to get more information on the structure, organisation and utilisation of the site, and to discuss possibilities for



Field trial on wheat with improved Powdery Mildew Resistance (Prof. Beat Keller, University of Zürich)

## Fascination of Plants Day 2015



Fascination of  
Plants Day  
May 2015

Under the heading "Why plants glow" the Institute for Quantitative and Theoretical Biology, headed by Oliver Ebenhöf, organised a workshop for pupils between 8 and 11. The action took place in the course of the

Fascination of Plants Day, an European-wide action day to inspire people for the fascination and importance of plant sciences. The workshop was very popular, more than 240 kids participated.

In addition there were also other activities around the Fascination of Plants Day at the Forschungszentrum Jülich and in Cologne.



Enthusiastic young scientists at work.  
(Foto HHU/Anke Peters)

## Accreditation process of the Bachelor Programme in Quantitative Biology



On June 12, the evaluation of the Bachelor programme in Quantitative Biology by the agency

AQAS took place at the HHU.

In a first preliminary summary, the

reviewing panel was very positive about the programme's intention and structure. The final decision on the approval will be announced in August this year.

The Bachelor programme is a 4-year Bachelor programme with focus on bioinformatics, statistics and mathematics, organised jointly between the Universities Cologne and Düs-

seldorf.

Anticipated start of the programme is in winter semester 2015.

The programme is open to all students having finished the 4th semester of a Bachelor Programme in Biology or Biochemistry with a strong background in mathematics.

[www.biologie.hhu.de/quantbio](http://www.biologie.hhu.de/quantbio)

## Holiday programme - „CEPLAS Forschertage“

On July 20-22, 2015 CEPLAS organises the first „Forschertage“ for pupils of the grades 11-13.

With this event we would like to show the students how fascinating plants are and how important they are for our daily life. Therefore we will combine short lectures with lots of do-it-

yourself experiments as well as discussions on current topics in plant sciences. The event will take place at the Cologne Biocenter and at the Wissenschaftsscheune of the MPI for Plant Breeding Research.

[ceplas/forschertage](http://ceplas/forschertage)



## NEXT DATES

1 July  
Women's Career Day  
[ceplas/women's career day](http://ceplas/women's%20career%20day)

1 July  
iGRAD Plant Symposium 2015  
[iGRAD Plant Symposium](http://iGRAD%20Plant%20Symposium)

20-22 July 2015  
CEPLAS Forschertage  
[ceplas/forschertage](http://ceplas/forschertage)

22-24 September 2015  
18. Conference of the Genome Research Working Group of the German Plant Breeding Association (GPZ)  
<http://www.gpz2015.hhu.de/>

25 September 2015  
CEPLAS at the „Lange Nacht der Wissenschaft“

13-14 October 2015  
Young Researcher's Retreat  
Bad Honnef

30 October 2015  
General Assembly with elections

30 October 2015  
CEPLAS Friday: Special guests  
Pam Ronald  
Milena Ouzunova

27 November 2015  
CEPLAS Friday

## Public lecture series: Vom Urweizen der Steinzeit zu den Genpflanzen der Zukunft

On May 12 the public lecture series 'Vom Urweizen der Steinzeit zu den Genpflanzen der Zukunft' ended with its last lecture on the challenges of the future. The lecture series this

year took place at the Cologne Bio-center. The six lectures were again very popular among the mixed-aged audience.

Due to the success, the lecture se-

ries will likely be offered again within the next semesters.

[\[ceplas/lecture series\]](#)

## SPD Conference „Zukunft der Wissenschaft: Nachwuchs fördern, Exzellenz ausbauen“

On June 8, members of CEPLAS participated in the SPD conference „Zukunft der Wissenschaft: Nachwuchs fördern, Exzellenz ausbauen“ in the Bundestag in Berlin. The main focus of the meeting was to discuss with representative of the parliament, DFG, Wissenschaftsrat and Universities about the future of

the scientific landscape and young scientists in Germany.

The background for this is the upcoming decision on the future format of the Excellence Initiative.

The current round of funding ends in October 2017. Up to know discussions about the future format of the new funding instrument are still on-

going, decisions are expected latest beginning of next year. Therefore time for conception and preparation of the new follow-up proposal will be very short this time.

[\[conference programme\]](#)

## CEPLAS meets politics

In April members of CEPLAS met with Patrizia Lips, (Abgeordnete des Deutschen Bundestags, Vorsitzende des Ausschuss für Bildung, Forschung und Technikfolgenabschätzung) to discuss about the importance of plant science for bioeconomy and for Germany as a

research site. Patrizia Lips recognized the importance of plant science in Germany and suggests to stay in continuous contact with politics. However she also noted plant science in Germany is still very difficult to communicate to the public due to the close association with genetic

engineering. In a follow-up meeting, CEPLAS representatives met with Dr. Stefan Kaufmann (Abgeordneter des Deutschen Bundestags, member of the Ausschuss für Bildung, Forschung und Technikfolgenabschätzung) for further discussions.

## Opening of the new crops section at the Botanical Garden Düsseldorf

On June 25, the new crops section at the Botanical Garden Düsseldorf was re-opened with the exhibition

### Nutzpflanzen: gestern | heute | morgen

The exhibition shows the development of wild to domesticated crop species, their usage and cultural history.

CEPLAS contributes to the exhibition with an own section on (energy) plants of the future. From July to September, several guided tours are offered within the exhibition and the CEPLAS part.



Official opening of the exhibition by Peter Westhoff, Director of the Botanical Garden



Different sugar plants. The exhibition is arranged according to the plants' usage.



New crop section on the Botanical Garden



CEPLAS section on (energy) plants of the future

[\[Botanical Garden/Exhibition\]](#)

## NEW FACES

**Yuanyuan Li - Postdoc**

Institute of Plant Molecular and Developmental Biology/Bioinformatics, HHU

Start: 01.04. 2015

Transforming *Arabidopsis* plants towards C<sub>4</sub> metabolism

**Otho Mantegazza - Postdoc**

Institute of Plant Biochemistry, HHU

Start: 15.04. 2015

Establishing a functional link between leaf development and C<sub>4</sub> photosynthesis

**Chihiro Furumizo - Postdoc**

Department of Comparative Development and Genetics, MPIPZ

Start: 01.05. 2015

Developmental basis for asexual reproduction in *Cardamine*

**Ganga Jeena - Postdoc**

Botanical Institute, Cologne Biocenter, UoC

Start: 01.05. 2015

Signatures of adaptation to biotrophy in root associated fungi: from saprotrophy to obligate biotrophy

**Richard Jacoby - Postdoc**

Botanical Institute, Cologne Biocenter, UoC

Start: 01.06. 2015

MS-based identification of secondary metabolites crucial for plant-rhizobacteria interactions

**Sira Groscruth**

**Coordination Graduate School and Equal Opportunity Office**  
(during maternity leave of E. Jawurek)

Start: 15.06. 2015

**Garret Early - DAAD Rise Fellow**

Institute of Quantitative and Theoretical Biology, HHU

Start: 01.05. 2015

Modelling of ultrasensitive signalling pathways

**Mirijam Garske - DAAD Rise Fellow**

Institute of Plant Molecular and Developmental Biology, HHU

Start: 01.05. 2015

Screening for leaf anatomy mutants and isolating T-DNA flanking sequences

## GUEST COMMENTARY

**CEPLAS from a master student's point of view**

I carried out my master thesis in the Institute for Microbiology at the Heinrich-Heine-University Düsseldorf. In doing so I worked on a CEPLAS project, studying the interaction between plants and microorganisms.

I had heard before of the Cluster of Excellence on Plant Sciences, but I did not know what it was about in detail. A look at the web page of the cluster of excellence gave me more information: It said that the goal of CEPLAS is the investigation of molecular and genetic principles of mechanisms, which have strong influence on plant growth, plant yield and utilization of available resources for a future sustainable production of crop plants.

The same thing happened to me while talking to family and friends. No one knew that a Cluster of Excellence on Plant Sciences existed in the region. Surely more people would be impressed by the range of research topics covered by the Cluster of Excellence and the ideas how made insights could be applied in the future, like I am, if only they knew about it.

During every day work I met CEPLAS in different ways. My colleagues that work on their Ph.D participated in seminars or workshops of CEPLAS graduate school and often came back with new suggestions. We had addition to our working group by talented Bachelor students, enabled

by CEPLAS research fellowships.

During the work on my thesis CEPLAS meant to me mostly listening to the interesting talks by guests and the suggestions and ideas that evolved in discussions with them. I liked a lot the possibility to participate in CEPLAS events, even if those are addressed mainly to Ph.D students. Therefore master students also benefit from CEPLAS, even if at this time point there are no events directly addressed to students aiming at their master's degree.

**Sabrina Baltes,**  
**Institut of Microbiology, HHU**  
**AG Dr. Vera Göhre**

## PLANTER'S PUNCH

Under the heading Planter's Punch we present each month one special aspect of the CEPLAS research programme. All contributions are prepared by our young researchers.

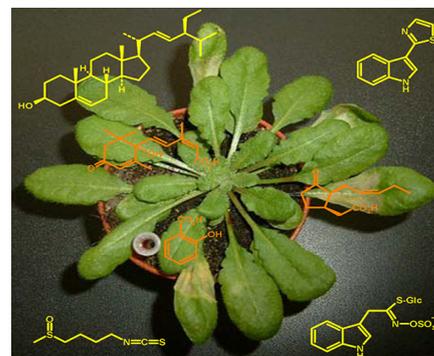
### Insights into the plant immune system

Plants have to cope with changing environmental conditions throughout their lifetime. To successfully grow and develop, they must adequately respond to a variety of biotic and abiotic factors. For instance, plants are equipped with an intricate defence network with which they counteract attempted invasion by bacterial, fungal, or viral plant pathogens. Our research group is interested in the molecular responses that plants activate after recognition of microbial invaders.

These responses are not confined to the initial site of microbial attack but can extend to other plant parts. For instance, plants are able to establish a broad-spectrum resistance of the

whole plant against a subsequent pathogen triggered by a first recognition or infection of a pathogen. This phenomenon, termed systemic acquired resistance (SAR), has been recognized in many different plant species including the model plant *Arabidopsis thaliana*.

Our project within CEPLAS intends on the identification of new metabolites which are exclusively synthesized in plants after pathogen-infections, investigate their function in inducible plant-defence and defining a regulatory network of pathogen-inducible metabolite pathways in plants. The identification and functional characterisation of immune-re-



gulatory metabolites holds great potential for the development of novel plant protection strategies.

**Contribution by Elia Stahl  
Institute for Plant Molecular Ecophysiology, Heinrich Heine University**

### Hunting the factors that rule C<sub>4</sub> anatomy

C<sub>4</sub> photosynthesis is a specialised form of photosynthesis that is distinguished from regular C<sub>3</sub> photosynthesis by the presence of a CO<sub>2</sub> supercharging mechanism that enables plants to fix CO<sub>2</sub> more efficiently. Due to this, C<sub>4</sub> plants require less water, grow faster and can cope better with high temperatures. C<sub>4</sub> plant leaves show a very distinct anatomy.

At the heart of C<sub>4</sub> photosynthesis lies a biochemical circuit that concentrates CO<sub>2</sub> in the cells surrounding leaf vasculature. In order to keep it operational, a specialized leaf anatomy is required. Therefore, the density of vascular network that distributes water throughout the leaf is increased. The cells adjacent to the vasculature, the so called bundle sheath

cells, are enlarged and contain high numbers of chloroplasts (fig.1).

While the biochemical part of C<sub>4</sub> photosynthesis has been detailed analysis, the genes in control of the altered anatomy are largely unknown. Therefore, we analyze the development of leaves from closely related C<sub>3</sub> and C<sub>4</sub> species. We use leaves of different ages to create a developmental gradient starting with initiating and ending with fully developed leaves. Next generation sequencing of transcriptomes gives us a view on the expression levels of all genes.

Combined with information on tissue structure and cell sizes, we try to determine the genetic networks that are altered.

**Contribution by Thomas Wrobel,  
Institute of Plant Biochemistry,  
Heinrich Heine University**

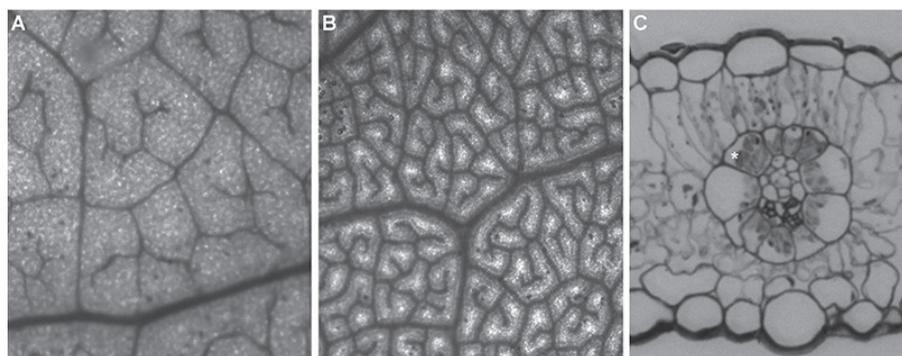


Figure 1: Comparison of the vein density of the C<sub>3</sub> plant *Flaveria robusta* (A) and the C<sub>4</sub> plant *Flaveria bidentis* (B). Both pictures were acquired using 6x magnification. Picture C presents the specialised anatomy of the C<sub>4</sub> plant *Flaveria bidentis*. Bundle sheath cells are marked with a star. The picture was taken at 20x magnification.