



Third Annual Report

July 2013 - June 2014

PlantLink is a competence resource in the area of plant science in Southern Sweden. PlantLink was formed in 2011 as an alliance between Lund University (LU) and the Swedish University of Agricultural Sciences in Alnarp (SLU Alnarp) with support from the Skåne Regional Council (Region Skåne). Our ambition is to stimulate and coordinate plant research and higher education in the region.

PlantLink bridges the gap between basic and applied plant research with the objective to improve crops and food products, and to enable production of materials, medication and energy from plants in a sustainable way. Associated to PlantLink are several within their field world-leading research groups.

PlantLink strives to increase the interest and competence in plant science through education and information. Our goal is to create an environment that promotes research and innovation and leads to dynamic interactions between the universities, companies and the general public.

Research

PlantLink Focus Areas

- Plant Breeding research, modeling and engineering
- 'Post-harvest' – product quality and new products
- Abiotic stress
- Plant–microbe interactions
- Plant–plant and plant–insect interactions

Major research projects associated with researchers in PlantLink

- Potato late blight resistance (SSF)
- ICE3 — Insect Chemical Ecology, Ethology and Evolution (Linnaeus project)
- TC4F Theme 4 — Other renewable plant resources, non-food crops
- Mistra Biotech

Focus on bioinformatics and new Biotron

On 1 May 2014 Dr. Estelle Proux-Wéra left PlantLink to start working for SciLifeLab in Stockholm. With the aim to strengthen the bioinformatical competence in plant research in Southern Sweden, she has worked full-time as the PlantLink bioinformatician since June 2012. She has among other things established the PlantLink server, which is mainly used for the analysis of sequence data. Estelle has assisted and finished several large projects concerning sugarbeet, nutsedge, apple and potato among other species. In the beginning of 2014 the server was equipped with an extended back-up. Estelle's duties were shared with bioinformatician Benjamin Almeida between February and June and from July 2014 Dr. Sandeep Kushwaha will start as the new PlantLink bioinformatician. He will be part of the BILS network (Bioinformatics Services to Swedish Life Science), a national research infrastructure supported by the Swedish Research Council.

In May 2014 SLU took the decision to build a new Biotron facility in Alnarp. PlantLink has been represented in a reference group which has examined the needs for a future facility. Construction is scheduled to start early 2015 and will approximately take one year. The Biotron has been identified by PlantLink as one of seven important regional platforms for plant research.

New Education Coordinator and Bioinformatician



Bioinformatician Sandeep Kushwaha



Education coordinator
Dennis Eriksson

Over the past year, PlantLink has seen the replacement of two highly appreciated co-workers with new faces.

The former PlantLink Bioinformatician Estelle Wera has moved to Stockholm and the SciLifeLab, where she has joined the Bioinformatics long-term support team (WABI) to work on several large-scale sequence data analysis projects. The former PlantLink Education Coordinator Mirja Carlsson Möller has taken up a position as Grants Manager at the Epilepsy Center, Lund University. We want to thank Estelle and Mirja for their valuable contributions and wish them all the best for their future careers.

Dennis Eriksson started working on a part-time contract in March 2014 and repla-

ced Mirja Carlsson Möller as Education Coordinator. Dennis has received his PhD degree in Plant Breeding and Genetics from SLU in Alnarp and has spent the last three years as a postdoctoral researcher at the Department of Plant and Environmental Sciences at Copenhagen University.

In July Sandeep Kushwaha who has previously been a post doc at the Department of Biology, Lund University, will start as the new PlantLink bioinformatician. His research interest lies in exploring the applied aspects of bioinformatics. Previously he has focused on metagenomic data analysis, large scale transcriptome analysis strategies

PlantLink seed money projects

During its three first years, PlantLink has announced three rounds of 'seed money' projects for smaller one year-long projects establishing new collaborations between the two universities. In 2013 the following five projects, out of 16 submitted proposals, were supported with a total of SEK 2.2 million:

Pollinators - how attractive is the colour, odour and shape of clover flowers?

Anna Balkenius (SLU Alnarp), Åsa Lankinen (SLU Alnarp) and Maj Rundlöf (LU)

Novel mass spectrometrical analyses for the identification of potato pathogens on potato leaves and their targets in the leaf apoplast

Svante Resjö (SLU Alnarp), Staffan Nilsson (LU), Sven Kjellström (LU)

Unravelling Fusarium-oat interaction mechanisms by proteomics

Fredrik Levander (LU), Salla Marttila (SLU Alnarp), Olof Olsson (CropTailor), Aakash Chawade (LU) and Erik Andreasson (SLU Alnarp)

Variability in sugar beet for impact of Trichoderma biocontrol

Susanne Widell (LU), Salla Marttila (SLU Alnarp), Kenneth Fredlund (Syngenta Seeds AB) and Allan Rasmusson (LU)

Insect pheromone production in plants: proof of principle (prolongation of seed money project from 2011)

Christer Löfstedt (LU), Sten Stymne (SLU Alnarp) and Per Hofvander (SLU Alnarp)

The 2014 call for 'seed money' projects (with deadline May 25th 2014) welcomed applications for extension of 'seed money' projects previously granted in addition to new collaborative projects. In total nine proposals were received. The decision which of these projects to support will be taken early fall 2014. For 'seed money' projects supported previous years, please see www.plantlink.se

Last year's PlantLink seed money publications

The production of synthetic insect pheromones for pesticide-free plant protection is associated with hazardous chemicals and byproducts. In a groundbreaking effort, Christer Löfstedt (LU), Sten Stymne (SLU), Per Hofvander (SLU) and postdoc Bao-Jian Ding used *Nicotiana benthamiana* as a plant factory to produce moth pheromones. The results of the project, supported by PlantLink 'seed money' in 2011 and 2013, recently made it into the prestigious Nature Communication [1].

Erucic acid is found in the seeds of many Brassicaceae plants and is highly interesting for industrial applications. Patrick Adlercreutz (LU), with financial support



Y. evonymella sex pheromone mimicked in planta

degree of economic potential for vegetable raw material for the industry [2].

Hemoglobins may be more involved in plant development than previously anticipated. In collaboration with Syngenta, Leif Bülow (LU) evaluated the gene expression of non-symbiotic hemoglobins in sugar

beet. The findings open up new possibilities for research and breeding of this and other important crop plants [3].

In addition, a report from the PlantLink seminar "Future of plant biotechnology in Europe" has been published in the Journal of the Swedish Seed Association (2013:1).

[1] Ding, B.-J., Hofvander, P., Wang, H.-L., Durrett, T.P., Stymne, S. and Löfstedt, C. (2014). Nature Comm, doi: 10.1038/ncomms4353.

[2] Kaki, S.S. and Adlercreutz, P. (2013). Biotechnol Bioeng, 110: 78-86.

[3] Leiva-Eriksson, N., Pin, P., Kraft, T., Dohm, J.C., Minoche, A.E., Himmelbauer, H. and Bülow, L. (2014). Plant Cell Physiol, doi: 10.1093/pcp/pcu027



Education

PhD Education

During the last year PlantLink has supported two PhD courses: "Plant Proteomics" (17-21 March 2014) together with TC4F and "Understanding population genetics" (7-11 October 2013) together with GENECO. Both courses were given in Lund and had approximately 25 participants.

The cooperation with Post Graduate Courses in Life Science (PCLS) at Lund University continues for a third successive year during the fall 2014, giving PhD students at SLU Alnarp full access to about 20 PhD-courses in molecular biology at Lund University. In return the plant-related course "Analytical and quantitative GC-MS" arranged at SLU Alnarp will be open for LU students as part of PCLS.

Master studies

Members from the Euroleague for Life Sciences (ELLS) subject area 'Plant Molecular Breeding and Biotechnology' met for a second time in November 2013 in Vienna. The subject area was formed two years ago after an initiative from PlantLink and includes five of the six ELLS universities. A master student's summer school, with the name "Plant molecular breeding to meet the challenges posed by climate change", has been granted funding by ELLS and will be held in Tulln outside Vienna 7-18 July 2014 hosted by BOKU. 30 master students have been admitted to the course and PlantLink sponsored three travel grants à 10000 SEK. In all five students from LU and SLU were admitted.

PlantLink joins EPSO



In September PlantLink joined the European Plant Science Organisation (EPSO) together with The Linnean Center for

Plant Biology in Uppsala as the SLU-Lund-Uppsala University cluster. The cluster includes Lund University, Uppsala University and SLU at Alnarp and Ultuna. Researchers working at any of these universities

can now join EPSO without any additional costs as an individual member via EPSO's homepage.

EPSO is an independent academic organisation that represents more than 226 research institutes, departments and universities. Its mission is to improve the impact and visibility of plant science in Europe. EPSO initiated Fascination of Plants Day, in which PlantLink has participated two two times, and helped PlantLink

and Mistra Biotech with the arrangement of the seminar day "The future of plant biotechnology in Europe – emerging technologies and policy making" in 2012. They are actively working with EU's framework program Horizon 2020. Prof Rodomiro Ortiz (SLU) represented PlantLink and The Linnean Center for Plant Biology in the 2013 annual EPSO meeting.



Budget and organization

PlantLink has an annual budget of 4,2 million SEK, with SLU and LU contributing 1 million respectively, 2 million from Region Skåne (Skåne Regional Council) and 0,2 million from BILS (Bioinformatics in Life Sciences). The funding from Region Skåne runs for a total of four years (until 2014).

From July 2013 to June 2014 the total salary costs was SEK 1 629 215. Positions funded are one director (40%), one scientific coordinator (30%), one education coordinator (20%), one bioinformatician (100%) and administration (10%). Other costs include information and outreach events, seminars, website and travels. Five seed money projects were granted in total SEK 2,200,000, which has been distributed between SLU and LU.

PlantLink Personnel

Leif Bülow (director)

Erik Alexandersson (research coordinator)

Dennis Eriksson (education coordinator)

Sandeep Kushwaha (bioinformatician from July 2014)

Knut Wälstedt (administrator)

Steering committee, 2013-2014

Marianne Sommarin, Umeå University, chair

Erik Andreasson, SLU

Leif Bülow, LTH (director)

Jeanette Flodqvist, Region Skåne

Pål-Axel Olsson, LU

Annette Olesen, Lantmännen Lantbruk

Allan Rasmusson, LU

Jens Sundström, SLU

Li-hua Zhu, SLU

Emelie Ivarson, PhD representative, SLU

Lotta Oskarsson, student representative, LU

Steering committee meetings

26 Augusti 2013, Lund

25 September 2013, Alnarp

7 March 2014, Lund

26 May 2013, Alnarp



Outreach

Social media

PlantLink has continued its extensive work with social media for the spreading of plant science related news, information, upcoming events etc. On Twitter we have more than 500 followers representing important organizations in plant science such as journals, institutes and companies. Over 200 people like our Facebook page. Nine newsletters are distributed per year and our homepage (www.plantlink.se) which carries information on PlantLink's work and structure, associated researchers, relevant courses etc., were visited on average by over 500 visitors per month.

Interactions

PlantLink has continued the interaction with several partners both in- and outside of our region, such as Copenhagen Plant Science Center, The Linnean Centre for Plant Biology, Umeå Plant Science Center, Mistra Biotech and Partnership Alnarp.

In collaboration with "Forskningsnätet Skåne" two high school students did a summer internship in research groups related to plant research. A number of guided visits for high school students as well as other groups from the Skåne region have been done upon request.

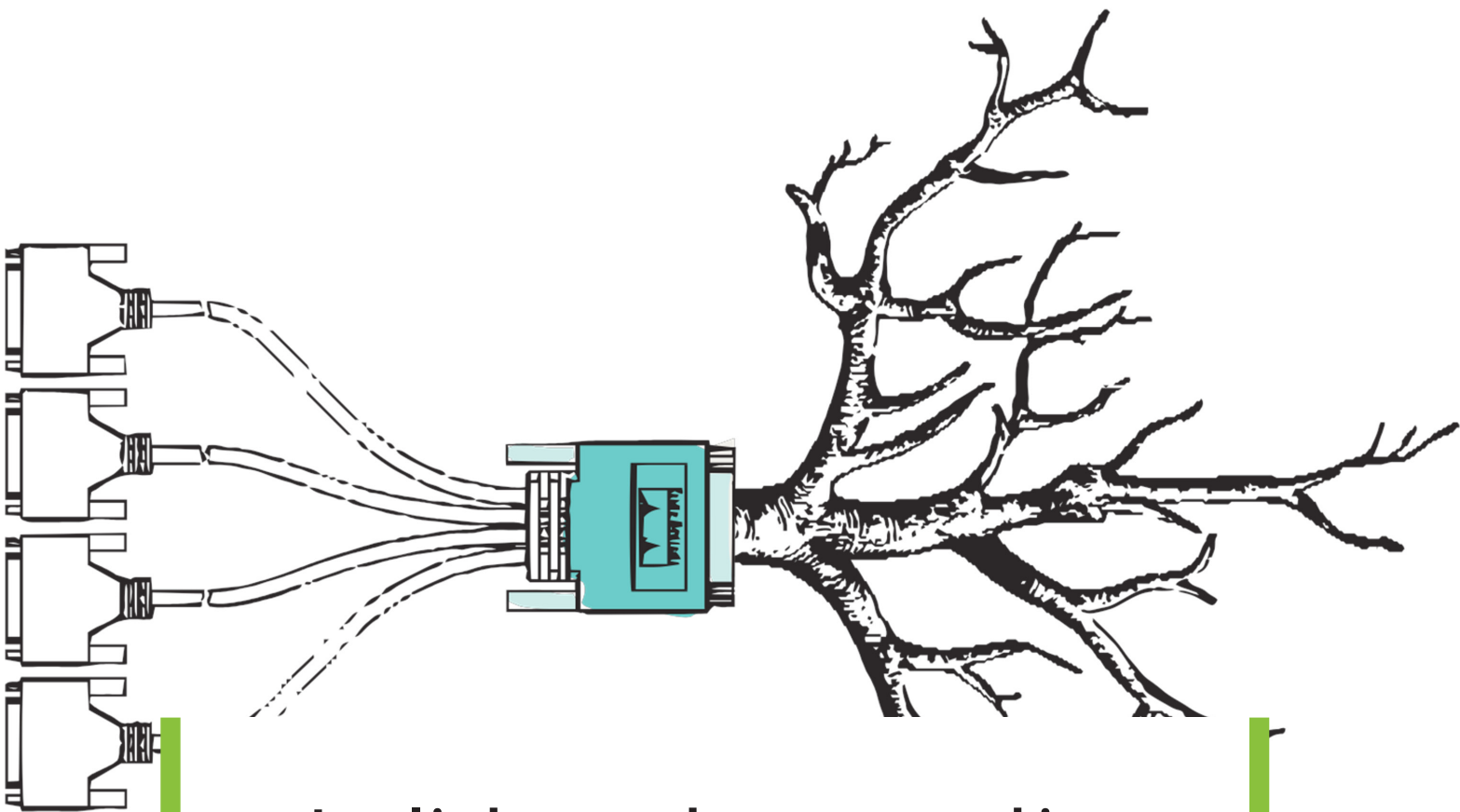
GenEthics

After years of controversy, the debate on genetically modified (GM) crops is hotter than ever. On 21 May 2014, a large crowd gathered in the Biology building in Lund to discuss the various facets of these modern

plant breeding technologies. The seminar, organised by the student union in Alnarp, was initiated by a description of the somewhat outdated EU regulations, given by Marie Nyman from the Swedish Gene Technology Advisory Board (Gen-tekniknämnden). Lennart Olsson from LUCSUS then presented a critical description of the consolidated and

highly influential seed industry, raising the rhetorical question if "we, in a democratic society, have the right to know what we eat". A "TED style" talk was given by Sten Stymne from SLU Alnarp, where he argued that opponents to GM crops are less influenced by rigorous science than by dogmatic ideas of what is, or is not, natural. The afternoon was then rounded off with a fruitful and high-spirited panel debate, including topics raised by the engaged audience.





Local industry and entrepreneurship

Several of Plant Links research activities are in close collaboration with local businesses, for example, in crop protection and plant breeding. During the year, an intense and exciting work begun on the creation of a **Swedish oat center**. Discussions are held with industry, universities and the lines on the regional and national politicians in order to establish a broad research and innovation center with oats as food crop.

PlantLink events 2013 - 2014

(number of attendees in brackets)

- **Hosted IITA pre-workshops**, 27-28 August in Alnarp
- **PlantLink Day**, 25 September 2013 in Alnarp (80)
- **A never ending battle – understanding resistance biology for sustainable agriculture**, together with Mistra Biotech, 10 October 2013 in Alnarp (70)
- **Joint meeting LCPB/UPSC/PlantLink**, 18-19 November in Uppsala (70)
- **Synthetic Biology Mini Symposium**, together with Copenhagen Plant Science Center, 13 February in Copenhagen (28)
- **The PlantLink server - where biology meets informatics**, 24 February in Lund (30)
- **Collection of Plant Genetic Resources - Heritage of the Humankind**, Igor Loskutov, Vavilov Institute, 10 April in Lund (20)
- **GenEthics – a discussion on GM crops**, organised by the Alnarp Student Union 21 May in Lund (80)
- **Alnarpsdagen**, 25 May in Alnarp. Participated

Upcoming events 2014

- **Master's student course in Plant Molecular Breeding to Meet the Challenges of Climate Change**, 7 - 18 July in Tulln, Austria
- **PhD course: Methods and Models for Plant Genomic Prediction and Selection in Plant Breeding**, 8-11 September in Alnarp
- **PlantLink Day**, 16 September 2014 in Lund

Contact and more information

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For more information also check our homepage: www.plantlink.se

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