PLANTLINK

Second Annual Report

July 2012 - June 2013

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 to researchers in PlantLink

- ICON New crops to break the chemical industry's dependency on crude oil (EC FP7 project)
- Potato late blight resistance (SSF)
- ICE3 Insect Chemical Ecology, Ethology and Evolution (Linnaeus project)
- Developing Sustainable and Energy Efficient Alternatives to Petroleum-Based Production of Energy and Materials (Formas)
- TC4F Theme 4 Other renewable plant resources, non-food crops
- Mistra Biotech

Focus on bioinformatics and future Biotron

With the aim to strengthen the bioinformatical competence in plant research in Southern Sweden, Dr. Estelle Wéra started working full-time within PlantLink in June 2012. Estelle has established the PlantLink server, which is mainly used for the analysis of sequence data. This includes transcript assembly, annotation, expression analysis and database creation to store and query results, but also for shorter inqueries such as multiple BLAST and phylogenetic analysis. Estelle divides her time between LU and SLU Alnarp, with offices in both places. She is also part of the BILS network (Bioinformatics Services to Swedish Life Science), a national research infrastructure supported by the Swedish Research Council.

The Biotron in Alnarp needs refurbishment and a reference group where PlantLink is represented has been examining the needs for a future facility. Last year a survey on usage and requirements was sent out to researchers within PlantLink. A report will be presented during fall 2013.

This is not an apple



from Alnarp

as the worm in the apple, mining the

In a PlantLink kowia. Yeast is an essential part of the larval diet and further promotes the groups of larval survival by reducing the inci- of microorganisms on host plant Peter Witzgall dence of fungal infestations in the ecology and their contribution to SLU apple. Larval feeding, on the other the signals that mediate host plant and hand, enables yeast proliferation on Jure Piskur from LU, have shown unripe fruit. Chemical, physiological that codling moth larvae are closely and behavioral analyses demonstassociated with yeast. The larva rate that codling moth senses and results were published in Journal of codling moth Cydia pomonella responds to yeast aroma. Female (Tortricidae, Lepidoptera) is known moths are attracted to fermenting yeast and lay more eggs on yeast fruit for food. Peter Witzgall and Jure inoculated apples than on yeast-Piskur have now shown that codling free apples. An olfactory response moth larvae are closely connected to yeast volatiles strongly suggests with yeasts of the genus Metschni- a contributing role of yeast in host

finding, in addition to plant volatiles. This underlines the impact finding and recognition. The study was part of a PlantLink seed money project awarded in 2011 and the of Chemical Ecology in August 2012 (38(8):949-57).

PlantLink seed money projects

During its two 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 2012 the following five projects, out of 12 submitted proposals, were supported with a total of SEK 2 million:

Rhizosphere N dynamics and symbiotic activities as influenced by application of biofertilizers Project leader: Georg Carlsson (SLU) Collaborators: Pål Axel Olsson (LU), Stig

Edner and Ann Thorén (SYSAV)

Vilda växters försvar mot naturliga fiender: Inducerat försvar och miljöeffekter inom och mellan generationer Project leader: Åsa Lankinen (SLU) **Collaborators:** Stefan Andersson (LU) and Erik Andreasson (SLU)

Devising a morphodynamic computational model for hypersensitive response development Project leader: Per Mühlenbock (SLU) Collaborators: Erik Andreasson (SLU) and Carl Troein (LU)

Towards the ecological meaning of Streptomyces-produced and induced volatiles in plant-insect-microbe interactions Project leader: Paul G Becher (SLU)

Collaborator: Klas Flärdh (LU)

Identification of glycerophosphocholine acyltransferase (GPCAT) genes in yeast and plants Project leader: Ida Lager (SLU) Collaborator: Allan Rasmusson (LU)

The 2013 call for 'seed money' projects (with deadline June 14th 2013) opened up for applications for extension of 'seed money' projects granted in 2011 or 2012 in addition to new collaborative projects. In total sixteen proposals were received. The decision which of these projects to support will be taken early fall 2013. For 'seed money' projects supported previous years, please see www.plantlink.se

Maintaining fertile soils

Rhizosphere nitrogen dynamics and symbiotic activities as influenced by application of biofertilizers. Symbiotic interactions between plant roots and soil microorganisms have profound effects on plant nutrient acquisition. While biogas digestates (biofertilizers) provide means for nutrient recirculation and promotion of crop productivity, their high nitrogen (N) availability may have rhizosphere of the legume Mediless beneficial effects on legume- cago sativa (lucerne) grown alone efficient use of biogas digestates. rhizobia symbiotic activities and N or with the grass Dactylis glomerata losses. This 'seed money' project uses a non-destructive approach



system and rhizobox with plants and roots of Medicago sativa

Macro imaging

based on two-dimensional optical sensors to monitor ammonia concentrations, pH and oxygen in the (cocksfoot), with and without biofertilizer application. The plants are promote soil fertility.

grown in Plexiglas rhizoboxes and a macro imaging system is used for capturing signals emitted by the optical sensors. In this three-part collaboration, the SYSAV Group provides biofertilizer for the experiments which are performed at SLU Alnarp, and LU analyzes the effects of biofertilizer on mycorrhizal fungi. The obtained knowledge will be of large importance for the development of sustainable systems for When combined with N₂-fixing legumes and mycorrhiza, this will

Education

PhD Education

During fall semester 2012 PlantLink supported two plant PhD courses: 'Plant Protection Biology' and 'Field-omics'. Both courses were given at SLU Alnarp and had approximately 15 participants coming from all over Sweden. The cooperation with Post Graduate Courses in Life Science (PCLS) at Lund University continues in 2013, giving PhD students at SLU Alnarp full access to 20 PhD-courses in molecular biology at Lund University. In return the plant-related course "Analytical and quantitative GC-MS" arranged at SLU Alnarp and will be open for LU students as part of PCLS. Together with the GENECO research school, PlantLink is planning a PhD-course in sequence analysis and database handling.

Euroleague for Life Sciences - ELLS

Members from the ELLS subject area 'Plant Molecular Breeding and Biotechnology' met for the first time in November 2012 in Alnarp. The SA (subject area) was formed last year after an initiative from PlantLink and includes five of the six ELLS universities. During the Alnarp meeting members met to discuss ways to exchange knowledge and strengthen higher education in the molecular plant biology. 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 is planned for the summer 2014 hosted by Copenhagen University with the cooperation from PlantLink.

Budget and organization

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

During the period from July 2011 to June 2012 the total salary costs was SEK 1,173,553. Positions funded are one director (20% until 2012, 40% from 2013), one scientific coordinator (30%), one education coordinator (50%), one bioinformatitian (100%) and administration (10%). Other costs include information and outreach events, seminars, website and travels. Five projects were granted in total SEK 2,000,000, which has been distributed between SLU and LU. Unused resources will be reallocated to the coming year.

PlantLink Personnel

Leif Bülow (director) Erik Alexandersson (research coordinator) Mirja Carlsson Möller (education coordinator) Estelle Wéra (bioinformatician) Knut Wålstedt (administrator)

Steering committee

Marianne Sommarin, Umeå University, chair Erik Andreasson, SLU Jeanette Flodqvist, Region Skåne Leif Bülow, LTH (director) Jens Sundström, SLU Carin Jarl-Sunesson, LU Annette Olesen, Lantmännen Lantbruk Sten Stymne, SLU Anders Tunlid, LU Ashfaq Ali (until Dec 2012)/Emelie Ivarson (from 2013), PhD student representative, SLU Johanna Emgård, student representative, LU

Steering committee meetings

24 September 2012, Lund 9 November 2012, Alnarp 11 February 2013, Lund 13 May 2013, Alnarp



Social media

PlantLink has continued its extensive work with social media for the spreading of plant science related news, information, upcoming events etc. Our Twitter account has over 350 followers and more than 160 people like our Facebook page. A monthly/bimonthly newsletter is distributed and our homepage (www.plantlink.se) carries information on PlantLink's work and structure, associated researchers, relevant courses etc.

Interactions and entrepreneurship

PlantLink has continued and deepened the interaction with several initiatives and potential collaboration partners both in- and outside of our region in order to create a rich network of external partners to form a platform for our future efforts to receive external funding from national and international research agencies. Over the past year, PlantLink has supported seven such applications for external funding.

A number of guided visits for high school students have been done upon requests from schools in the Skåne region.

Internship

In a collaboration with "Forskningsnätet Skåne" two high school students did a summer internship in a plant research laboratory in 2012. The two students, Angelica Grönwall from S:t Petri skolan in Malmö and Hanna Isendahl from Skolstaden in Helsingborg, fol-



Hanna Isendah

lowed the researchers in their daily routines - both in the field and in the lab.

- The most interesting thing was that you got to see the results of the work, says Hanna. From picking leaves in the field and label them, to inject the mold and finally see what happened. Both students felt they got a good insight to molecular plant research and were surprised to learn that research involves not only theoretical thinking but a lot of hands-on, practical work.

Forskningsnätet Skåne is a network that promotes interactions between high school students and universities by bringing academic researchers to the class rooms.



Angelica Grönwall

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PlantLink public events 2012 - 2013

(number of attendees in brackets)

- Scandinavian Plant Proteomics Day together with Umeå Plant Science Center and KBC, Umeå University, 20 September 2012 in Umeå
- PlantLink Day, 24 September 2012 in Lund (80)
- 'The Future of Plant Biotechnology in Europe – emerging technologies and policy making together with Mistra Biotech, 7 November 2012 in Alnarp (105)
- Jordbruks- och trädgårdskonferens, 27 February in Alnarp Participated
- From farm to fork plant molecular breeding and post-harvest research in the 21st century together with Food Technology at LU and Department of Plant Breeding at SLU Alnarp, 21 March 2013 in Lund (80)

- Fascination of Plants Day, 18 May 2013 in the Botanical Gardens at Lund University (ca 100)
- Alnarpsdagen, 26 May 2013 in Alnarp. Participated
- 'Perenniation: Solutions To Farming's Annual Problems', Jerry Glover, 27 May, 2013 in Alnarp (30)
- Workshop with PlantLink researchers and human geographers at Lund University, 28 May in Lund (16)

Upcoming events 2013

- PlantLink Day, 25 September 2013 in Alnarp
- Plant Resistance Seminar togehter with Mistra Biotech, 10 October
- Swedish Plant Science Centers' symposia together with UPSC and Linnéan Plant Science Center, 18 - 19 November in Uppsala

Contact and more information

Follow us on Facebook and Twitter to get continuous updates from PlantLink. For more information also check our homepage: **www.plantlink.se**

| Name | E-mail | Telephone |
|--|----------------------------------|---------------------|
| Leif Bülow Director | leif.bulow@tbiokem.lth.se | +46 (0)46-222 95 94 |
| Erik Alexandersson Research Coordinator | erik.alexandersson@slu.se | +46 (0)40-41 53 38 |
| Mirja Carlsson Möller Education Coordinator | mirja.carlsson_moller@biol.lu.se | +46 (0)46-222 77 39 |
| Estelle Wéra Bioinformatician | estelle.wera@slu.se | +46 (0)40-41 53 93 |
| Knut Wålstedt Administrator | knut.walstedt@slu.se | +46 (0)40-41 55 48 |

