



## Ninth Annual Report

July 2019- June 2020

**PlantLink is a network platform for plant science in Southern Sweden.** It was formed in 2011 as an alliance between Lund University (LU) and the Swedish University of Agricultural Sciences in Alnarp (SLU Alnarp) with initial support from the Skåne Regional Council (Region Skåne). Our ambition is to stimulate, unite and promote plant research and higher education in the region.

PlantLink wants to bridge the gap between basic and applied plant research with the objective to provide plants as part of a sustainable plant production for healthy food, future climate, medication, energy and new green materials. PlantLink gathers around 30 research groups and provides a platform for interactions between industry and universities in Southern Sweden as well as in Denmark.

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

# Research

## PlantLink Focus Areas

- Plant Breeding and engineering
- 'Post-harvest' – quality and new products
- Abiotic stress
- Biotic interactions
- Modelling and informatics
- Plants, People and Society

## Major research projects associated with researchers in PlantLink

- C4F
- CropBooster-P
- EMPHASIS
- Future oil crops (SSF)
- Mistra Biotech (Mistra)
- MSCA-ITN PROTECTA PhD program
- NordPlant (NordForsk)
- Production of a blood substitute (SSF)
- Resilient Northern Crop Network - Nord-Crop (NKJ)
- ScanOats (SSF)
- SLU GroGrund
- STEPS (Mistra)
- The Human Aspect of Invasive Alien Plants – the paradox of plants, people and personal preferences (Pufendorf IAS)

## PlantLink strengthens coordination efforts

Apart from supporting plant research in the region, one of the cornerstones of PlantLink has been to create a platform for strong network building. To strengthen this and to be able to build new links for plant researchers in the region, PlantLink recruited a new coordinator first half of 2020. See box on next page.

This also means a shift of focus from the PlantLink bioinformatics support, which started in June 2012. Then, there was an urgent need to strengthen the bioinformatics for plant science in the region. However, bioinformatics is today more integrated in plant sciences and there is additional strong local bioinformatics support available for PlantLink researchers both through the presence of NBIS and SLUBI. Consequently, PlantLink stopped its active support to bioinformatics in May 2020. Our PlantLink-associated bioinformatician, Varma Saripella, is continuing as a full-time staff bioinformatician at SLU Alnarp as part of the SLUBI initiative.

Over the years, the PlantLink support has gone to about 20 larger bioinformatics projects leading to more than 20 publications. It has also supported the infrastructure of the PlantLink server, which was complemented with the server Udda in 2018 and now most recently with a third server, Even, in 2020.

## Thomas Moritz, new chair of PlantLink



**From September 2019, Thomas Moritz** has taken over as chair of PlantLink's steering committee, after Marianne Sommarin who held the position from the start of PlantLink. Thomas has long been a professor at SLU Umeå, among other things he has been head of the Department of Forest Genetics and Plant Physiology. Now he is sharing his time between SLU Umeå, and University of Copenhagen where he is working at the NovoNordisk Foundation Centre for

Basic Metabolic Research (CBMR). Thomas is interested in using analytical chemistry to study biologically relevant questions. The last 15-years, his focus has been metabolomics-oriented research, mainly related to plant development. At CBMR he is now setting up a metabolomics platform, to develop and apply metabolomics methodology in different biomedical projects.

## PlantLink supported publications 2019-2020\*

Anaokar, S., Kodali, R., Jonik, B., Renne, M. F., Brouwers, J. F., Lager, I., ... & Patton-Vogt, J. (2019). The glycerophosphocholine acyltransferase Gpc1 is part of a phosphatidylcholine (PC)-remodeling pathway that alters PC species in yeast. *Journal of Biological Chemistry*, 294(4), 1189-1201.

Odilbekov, F., Armoniené, R., Koc, A., Svensson, J., & Chawade A (2019) GWAS-Assisted Genomic Prediction to Predict Resistance to Septoria Tritici Blotch in Nordic Winter Wheat at Seedling Stage. *Frontiers in Genetics*. 10:1224.

Odilbekov, F., He, X., Saripella, G. V., Armoniené, R., Henriksson, T., Singh, P. K., & Chawade, A. (2019). QTL Mapping and Transcriptome Analysis to Identify Differentially Expressed Genes Induced by Septoria Tritici Blotch Disease of Wheat. *Agronomy*. 9, 1-15

Geleta, M., Gustafsson, C., Glaubitz, J. C., & Ortiz, R. (2020). High-Density Genetic Linkage Mapping of Lepidium Based on Genotyping-by-Sequencing SNPs and Segregating Contig Tag Haplotypes.

*Frontiers in Plant Science*, 11, 448.

Willforss, J., Leonova, S., Tillander, J., Andreasson, E., Marttila, S., Olsson, O., ... & Levander, F. (2020). Interactive proteogenomic exploration of response to *Fusarium* head blight in oat varieties with different resistance. *Journal of Proteomics*, 218, 103688.

Becher, P. G., Verschut, V., Bibb, M. J., Bush, M. J., Molnár, B. P., Barane, E., ... & Buttner, M. J. (2020). Developmentally regulated volatiles geosmin and 2-methylisoborneol attract a soil arthropod to *Streptomyces* bacteria promoting spore dispersal. *Nature Microbiology*, 5(6), 821-829.

Alexandersson, E., Kushwaha, S., Subedi, A., Weighill, D., Climer, S., Jacobson, D., & Andreasson, E. (2020). Linking crop traits to transcriptome differences in a progeny population of tetraploid potato. *BMC plant biology*, 20(1), 1-14.

\*Either with seed money or bioinformatics support

## NordPlant

In this PlantLink initiative, five Nordic universities have established NordPlant to promote education, research mobility and technological development to meet future challenges in Nordic agriculture and forestry. NordPlant ([www.nordplant.org](http://www.nordplant.org)) is one of six Nordic University Hubs funded by NordForsk.

During the last year, a number of joint research projects are supported in NordPlant, such as „Strawberry light quality project“, „Assessing the cost of host resistance“, „Phenotypic characterization for drought tolerant potatoes“ and „Cuticular waxes in bilberry“. In addition, a major effort has been made towards evaluating and establishing common standards for plant phenotyping data between the partners. This is necessary as plant phenotyping produces large and diverse types of data, which need to be linked to detailed and advanced universal descriptions.

20 November 2019 the first NordPlant annual meeting was held in Lund with international speakers and flash presentations from companies. NordPlant actively ties international and company contacts. For example, a SASUF ([sasuf.org](http://sasuf.org)) grant was received for outreach with Swedish and South African private and academic stakeholders working with remote sensing.

One new post doc and two MSc students were involved in NordPlant projects during the year. In June 2020 NordPlant received the positive decision that the project will get prolonged support from NordForsk for a 3-year period in 2021-2023.

## New PlantLink coordinator Sofia Marmon

**Sofia Marmon** became coordinator of PlantLink in June 2020. Sofia is a researcher at the Division of Pure and Applied Biochemistry at Lund University, working within ScanOats. She previously worked at the Department of Plant Breeding at SLU, Alnarp. Sofia's research area is enzymes involved in seed lipid biosynthesis and breakdown, within ScanOats her research focus is lipases and their role for oat storage properties. Oat for human consumption is heat treated

to inactivate the lipases and increase the storage stability. One of the aims of Sofia's research is to develop low-lipase oat varieties where no such heat treatment is needed. Sofia will work 50% at PlantLink, among other things working with PlantLink's industrial mentorship program, organizing seminars and support Plant Link's 6 focus areas.



Photo: Oscar Marmon

## Education

During the last year, PlantLink supported the PhD Course “Accelerating climate resilient plant breeding by applying -omics and artificial intelligence”, 20-24 April 2020 at SLU Alnarp. The course was organized by the SLU Platform Plant Breeding and the Industry Research School of Forest Genetics and Biotechnology.

The cooperation between the LTV faculty and the Post Graduate Courses in Life Science (PCLS) at Lund University is now well established and continued for a sixth time during the autumn 2019, giving PhD students at SLU Alnarp full access to about 15 PhD-courses in molecular biology at Lund University. LU students also got access to PhD courses organized by SLU, one of them the PlantLink sponsored PhD-course „Microscopy methods in biological research“ 9-13th of December. The course was located partly at Lund University, Department of Biology, partly at SLU campus Alnarp, Department of Plant Protection Biology.

The PlantLink teacher's exchange took place again between the courses Plant evolution and adaptation at LU and Botany and plant knowledge (Botanik och Växtkännedom) and Advanced plant and site knowledge (Utökad växt och ståndortskännedom) at SLU Alnarp. Students at Alnarp got insights in phylogeography, conservation genetics, and invasive species. The students in Lund got lectures in Plant immunity and plant pathogen interactions, and in pollen competition and sexual conflicts. The feedback from teachers and students was positive, and PlantLink will continue this initiative to boost plant education at our universities. Do you teach in plant science, botany or plant ecology? Welcome to suggest teacher exchanges for upcoming courses!

## Networking in the shadow of Covid19

**The global outbreak of Covid19** during spring 2020 calls for new ways of networking. PlantLink tried to adapt quickly and the Open Strategic network meeting was with short notice shifted partly online (see page 6). Furthermore, the outbreak triggered PlantLink to host its first webinar: “Healthier plants with the help of Biologicals?”. With financial support of SIANI and SLU Global it attracted over 150 participants all over the globe.

This webinar was part of the UN's International Year of Plant Health, which has been largely overshadowed by the Covid19 outbreak with most events cancelled or postponed.

We are looking into new, innovative ideas to keep the networking going online. Linked to ESCAPaDE (<http://escapade-erasmus.eu/>), which has the goal to improve the curricula in Plant Sciences for graduate students,

we will host both a summer school and a job fair in Alnarp 2021. We will see what the format will be, but still believe in the importance of the physical meeting.



## Budget and organization

**PlantLink had a budget of 1,9 million SEK over the year**, with SLU and LU contributing ca 1 million and 0,5 million SEK each. From July 2019 to June 2020 the total salary costs were 910,000 SEK. Positions funded were one director (40% - 25% PlantLink and 15% NordPlant), one assistant director (25%), one bioinformatician (25%, to May), one coordinator (25%, from June), and one NordPlant administrator (20%).

Other costs include information and outreach events, seminars, website and travels. NordForsk funding contribute with 269,000 SEK/year for coordination of the project NordPlant.

### **PlantLink Personnel 2019-2020**

Erik Alexandersson (director)  
Tina D'Hertefeldt (assistant director)  
Varma Saripella (bioinformatician), to May 2020  
Sofia Marmon (coordinator), from June 2020  
Svante Resjö (NordPlant administrator)  
Thomas Welwert (economy administrator)

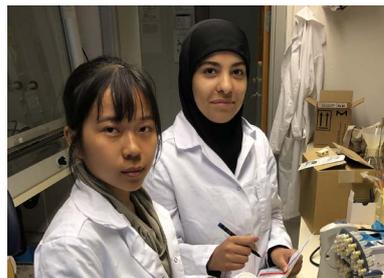
### **Steering committee, 2019-2020**

Thomas Moritz, University of Copenhagen and SLU Umeå, chair  
Erik Andreasson, SLU  
Mariette Andersson, SLU  
Jean Yong, SLU  
Leif Bülow, LTH  
Rajni Hatti-Kaul, LU  
Allan Rasmusson, LU  
Annette Olesen, Lantmännen Lantbruk  
Jenny Bergsten, Region Skåne  
Linnea Almqvist Stridh, PhD representative, SLU  
Gróa Valgerdur Ingimundardottir, PhD representative, LU

Permanent observatory member  
Svend Christensen, University of Copenhagen

### **Steering committee meetings**

3 October 2019, Alnarp  
2 December 2019, Lund  
24 March 2020, Alnarp  
3 June 2020, Lund



Hajird Jawad and Quyen Bui, two high school students with summer internships 2020 related to plant research together with „Forskningsnätet Skåne“, see next page.



## Outreach

### Social media

PlantLink has continued its extensive work with social media for the spreading of plant science news, information, and upcoming events. On Twitter we have more than 1300 followers representing many important organizations in plant science. Over 1900 people like our Facebook page. Nine newsletters are distributed per year and our homepage ([www.plantlink.se](http://www.plantlink.se)), which carries information on PlantLink's work and structure, associated researchers, relevant courses etc., was visited by over 3000 unique visitors. Since 2018 we administrate NordPlant's new homepage ([www.nordplant.org](http://www.nordplant.org)) and bi-annual newsletter.

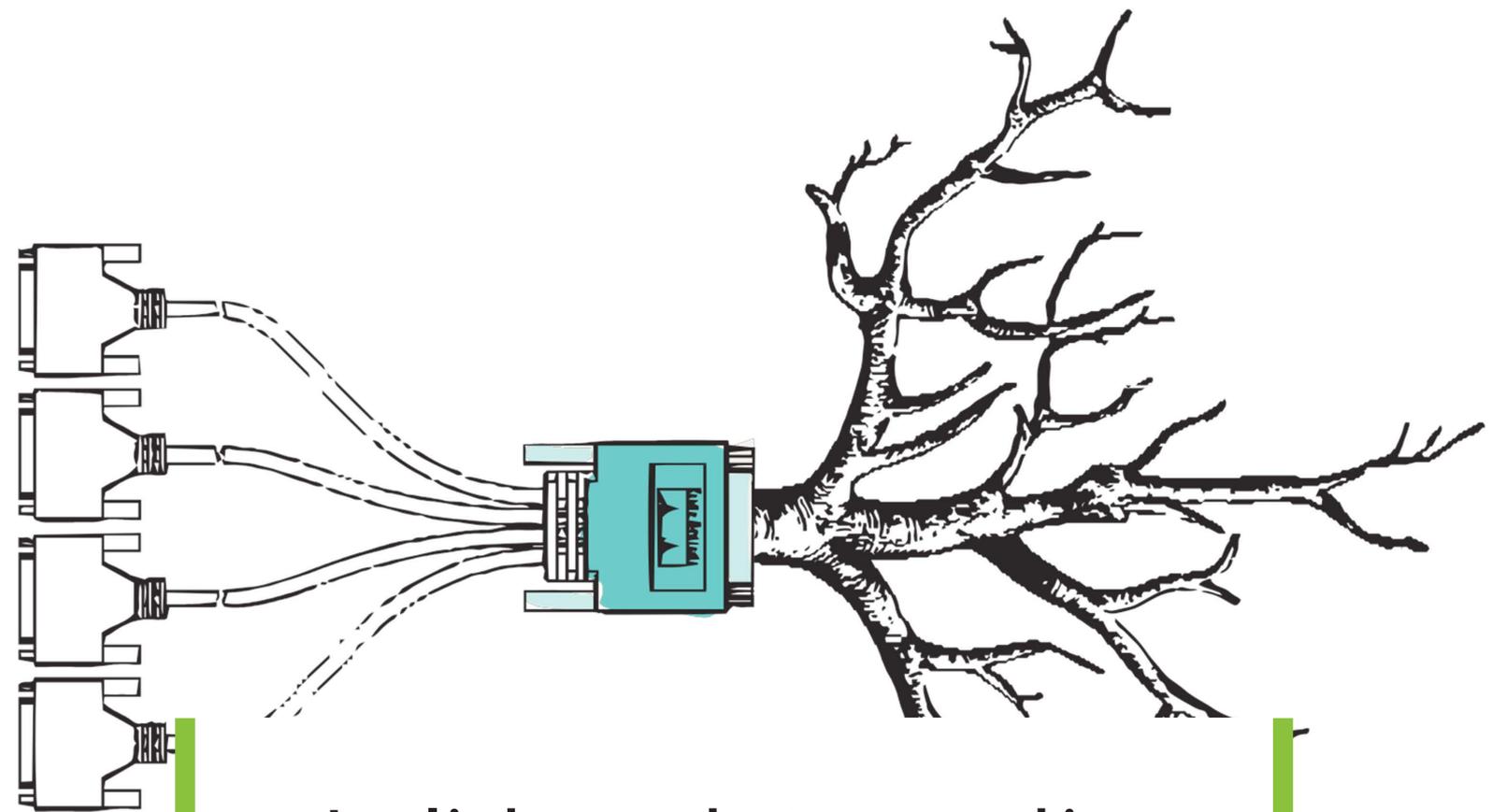
### Interactions

PlantLink interacts with several partners. Our collaboration with PLEN at University of Copenhagen continues. We have an active dialogue with The Linnean Centre for Plant Biology, Umeå Plant Science Center, EPSO, Mistra Biotech, EMPHASIS and CropBooster-P. In collaboration with "Forskningsnätet Skåne" four high school students did a summer internship related to plant research.

## PlantLink Open Strategic network meeting

**More initiatives and large research projects** around plant science are seen than ever before in the Skåne region. In March 2020, PlantLink therefore organized an open discussion with representatives of networks related to plant science. The aim was to investigate how we can collaborate in an efficient way in this growing eco-system of plant-related initiatives. During the half-day partly online meeting, 24 organizations discussed possible links in research, education and innovation. Annika Åhnberg from Växtnoden summarized the discussion on research in that „yes, plant science in the region is better organized today.“ There should be options to work towards regional support, since the sector of plant science has received increased interest from society, compared to previously when it was placed more in the background. Anders Nilsson (Växtnoden) summarized the education section, which centred around initiatives to attract students to

plant education at the Masters level. This included increased activity on all levels from gymnasiums to interactions with the industry, using a renowned competition concept as well as facilitating mobility between SLU Alnarp and LU. Lise Lykke Steffensen (NordGen) summed up the discussion on innovation and policy with that „researchers need to think outside the box and should meet people“. The entire discussion on innovation and policy centered around communication, long-term commitment and building trust. Lise Lykke established that the geographical region is an IT and biotechnology hub, and that platforms are needed so that we can speak to each other. The network meeting concluded that there is definitely room for collaborations between the universities, industry and policy in the region, and PlantLink will investigate future initiatives for network-to-network interactions.



## Local industry and entrepreneurship

Several of PlantLink's research activities are in close collaboration with local businesses, for example, in crop protection and plant breeding. One important outcome is the PlantLink PhD/Post Doc Industrial Mentorship Program, which started for the fourth time in 2019. This time, part of the program was run in collaboration with the SLU mentorship program VÅXA. For the first time, a mentorship in forestry was included.

NordPlant engaged Nordic companies by for example arranging company tech corners during the annual day and through SLU Holding producing a survey of Swedish companies using AI for agriculture. Our support for SLU Alnarp membership in the Plant Biologicals Network Southern Scandinavian (PBN) continued and is now also covering the membership fee for Lund University.

## PlantLink sponsored events 2019 - 2020

(number of attendees in brackets)

- ELLS Summer School for bachelor students „Green Genetics“, 26-30 August, at Wageningen University. (1)
- PlantLink Day, 3 October, in Alnarp. (101)
- “Tech talks for plant phenotyping in the Nordic countries” – 1st NordPlant annual meeting, 20 November, in Lund. (>80)
- 4th round of PlantLink Industrial Mentorship program, last meeting November, 2019. (10)
- PhD course „Microscopy methods in biological research“ 9-13 December, in Alnarp and Lund. (6)
- PhD course „Accelerating climate resilient plant breeding by applying –omics and artificial intelligence“, 20-24 April, in Alnarp. (34)
- PlantLink's Open Strategic network meeting, 13 March. (36)
- Webinar „Healthier plants with the help of Biologicals“ 19 May. (>150)

## Upcoming events 2020

- **MSc/PhD course**, „Plant Protection Biology to meet the UN's Sustainable Development Goals“, 3-14 August, in Alnarp and online
- **PlantLink Day**, 14 October, in Alnarp and online
- **NordPlant Annual Day**, 4-6 November, online

## Contact and more information

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For more information check our homepage: [www.plantlink.se](http://www.plantlink.se)

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