

The Netherlands

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Centre for BioSystems Genomics, the Netherlands Plant Genomics Network

Within this national plant genomics research programme the Arabidopsis research focuses on the analysis of the regulatory network of genetic, biochemical, physiological and environmental interactions that control plant performance and the complex traits involved in plant-oomycete interactions and adaptation to stresses. Fully integrated large-scale activation tag screening, gene expression, proteome and metabolite profiling is aimed for and based on the full exploration of the available genetic variation with emphasis on control of metabolic composition. Understanding of the adaptive traits relevant for research in potato and tomato is another important subject as is the development of concepts and technologies based on the availability of the whole Arabidopsis genome sequence and efficiency of Arabidopsis genetics. Four different projects respectively focus on:

1. Arabidopsis quality: the genetic and genomics analysis of metabolic composition. Koornneef/Vreugdenhil, Wageningen University; Pereira, Plant Research International, Wageningen; Smeekens, Utrecht University.
2. The analysis of ligand-receptor interaction networks in Arabidopsis. Angenent, Plant Research International, Wageningen; Heidstra, Utrecht University; De Vries, Wageningen University.
3. The role of chromatin structure in gene expression of Arabidopsis and tomato. Bisseling/de Jong, Wageningen University.
4. Priming of defence gene expression in plant-oomycete interactions. Pieterse/van den Ackerveken/Ackerveken, Utrecht University.

Arabidopsis projects funded by other sources such as first flow university funds, second flow Netherlands Organisation for Scientific Research, EU etc. and third flow contract research.

Wageningen University

1. QTL express: identification of plant performance traits in Arabidopsis by combining high-throughput mapping and expression profiling (M. Koornneef, D. Vreugdenhil).
2. Heavy metal tolerance and accumulation in *Thlaspi caerulescens*, a heavy metal hyperaccumulating plant species (M. Aarts).
3. Brassica vegetable nutrigenomics (M. Aarts).
4. Do plants love heavy metals? (A. Assunção)
5. The role of tomato serine and cysteine proteases in defence signalling (R. van der Hoorn)
6. A molecular genetic approach to chemical ecology and community ecology (M. Dicke)
7. Cross-talk between signal-transduction pathways in induced defence of Arabidopsis against microbial pathogens and herbivorous insects. M. Dicke (joint projects with C. Pieterse, Utrecht University)
8. Development of a method for breeding of cucumber for improved attraction of biological control agents (M. Dicke, H. Bouwmeester)
9. From genetic code to ecological interactions: molecular, phytochemical and ecological aspects of a glucosinolate polymorphism in *Barbarea vulgaris*. (N. van Dam)
10. Arabidopsis: the system to study structure and function of heterochromatin (T. Bisseling)
11. Chromatin genomics: functional analysis of Arabidopsis chromatin remodeling genes in development (T. Bisseling)
12. Wageningen Phytoinformatics: the added value from plants (W. Stiekema)

Plant Research International, Wageningen

1. Isolation and characterisation of key-genes in the formation of germination stimulants of the parasitic weeds *Striga* and *Orobanche* (H. Bouwmeester).
2. LRR receptor-like proteins and their functions in plant signaling (G. Angenent).
3. MADS box transcription factor functioning (G. Angenent)

4. Signalling Pathways Controlling Embryogenic Cell Development in Arabidopsis (K. Boutilier)
5. Signalling in the shoot apical meristem: A question of determinate or indeterminate growth (R. Immink)

Utrecht University

1. Sugar signalling pathways in plants (J. Smeekens)
2. Trehalose-6-phosphate as a regulatory molecule in plants (H. Schlüpmann)
3. Control of plant architecture (M. Proveniers)
4. Dormancy as survival mechanism in plants (L. Bentsink)
5. Cross-talk between signal-transduction pathways in induced defence of Arabidopsis against microbial pathogens and herbivorous insects (C. Pieterse, joint projects with M. Dicke, Wageningen University)
6. Exploring the plant innate immunity immune response (C. Pieterse)
7. A functional proteomics approach to identify phospho-proteins involved in plant innate immunity (F. Menke)
8. Priming in plant-pathogen interactions: the molecular mechanism of the alarmed state (J. Ton)
9. Kinome profiling in Arabidopsis using PepChips (T. Ritsema)
10. Signalling at the host-microbe interface: pathogen-induced modulation of the plant plasma membrane (G. van den Ackerveken)
11. Understanding host plant susceptibility and resistance by indexing and deploying obligate pathogen effectors (G. van den Ackerveken)
12. Functional analysis of Arabidopsis *DOWNY MILDEW RESISTANCE* genes and their application in generating downy mildew resistant crops (G. van den Ackerveken)
13. Genetic networks in root development: Interplay between cell polarity information, pattern formation cues, and control of cell division (B. Scheres)
14. Control of transcription factor movement and boundary establishment in roots (I. Blilou)
15. Control of oriented cell division by transcription factor networks in roots (V. Willemsen)
16. Genomics for multicellular development: Function of the quiescent center in regulation of pattern formation and differentiation within the *Arabidopsis thaliana* root meristem (R. Heidstra)
17. Analysis of the hyponastic and differential growth response of *Arabidopsis thaliana* petioles induced by submergence and low light conditions (T. Peeters, R. Voesenek)

Leiden University

1. Characterization of a novel regulator of plant secondary metabolism (J. Memelink)
2. Effect of NHR mutations on genome stability and development in Arabidopsis (P. Hooykaas)
3. Artificial zinc finger transcription factors as regulators of plant function (E. van der Zaal)
4. ORA EST: Functional analysis of jasmonate-responsive AP2/ERF-domain transcription factors in *Arabidopsis thaliana* (J. Memelink)
5. Regulation of polar auxin transport by PINOID protein kinase signaling to the actin cytoskeleton. (R. Offringa) Plant protein kinases orienting auxin-mediated plant development; Phospho-fingerprinting plant development; The role of auxin in fruit initiation; Modeling auxin transport (R. Offringa)
6. Protein ubiquitination in auxin- and jasmonic acid-dependent plant development and defense (R. Offringa & J. Memelink)

University of Amsterdam

1. Role of PA kinase in plant stress signalling (T. Munnik)
2. Targets for the novel lipid second messenger, phosphatidic acid (C. Testerink)
3. SUMO-signaling in plants (H. van den Burg)

Vrije Universiteit, Amsterdam

1. Function of meristem identity in flower and inflorescence development (R. Koes)
2. Genetic control and evolution of inflorescence architecture (R. Koes)

University of Groningen

1. Molecular biology of programmed cell death in higher plants (Dijkwel, J. Hille)

Radboud University Nijmegen

1. Role of type 1 MADS box gene in gametophyte and seed development (G. Angenent)