Achieving sustainability I: Crop genomes for sustainable agriculture

CV 46: Pere Puigdomenèch

Professor of Research CSIC
Centre for Research in Agricultural Genomics, CSIC-IRTA-UAB
Jordi Girona, 18. 08034 Barcelona. Spain
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Career
Ph.D. in Biology. Autonomous University of Barcelona
Postdoc. Biophysics Unit. Portsmouth Polytechnic. UK
Assistant Professor. Biochemistry. Autonomous University of Barcelona
Research assistant. Max-Planck-Institut für Molekulare Genetik. Berlin
Researcher. Institute of Biology. CSIC. Barcelona

Research Interests
Plant evolution and selection relies on the availability of genetic variability. At present we have molecular tools that enable us to study the basis of this variability and to use it to understand phenotypic variation and to produce new varieties useful for their use in agriculture. In our laboratory we are comparing the genomes of Cucurbitaceae, an important group of horticultural plant species between themselves and the genomic variability between both materials used for breeding and ancestral accessions. At the same time we are studying in maize the effects of a group of transcription factors that regulate lignin biosynthesis. Variations in the regulatory properties of these factors may lead to important phenotypic changes. Structural and regulatory variability are the aim of most of our studies.

2-4 Recent Publications
- Generation of a BAC-based physical map of the melon genome. González VM, Garcia-Mas J, Arús P, Puigdomènech P. BMC Genomics. 2010, 11:339.
- The maize ZmMYB42 represses the phenylpropanoid pathway and affects the cell wall structure, composition and degradability in Arabidopsis thaliana. Sonbol FM, Fornalé S, Capellades M, Encina A, Touriño S, Torres JL, Rovira P, Ruel K, Puigdomènech P, Rigau J, Caparrós-Ruiz D. Plant Mol Biol. 2009, 70:283-96
- Mutator-like elements identified in melon, Arabidopsis and rice contain ULP1 protease domains. van Leeuwen H, Monfort A, Puigdomenech P. Mol. Genet. Genomics. 2007, 277:357-364

Achieving sustainability II: Breeding tools and strategies

CV 47: Arjen van Tunen

CEO
Keygene N.V.
Agro Business Park 90
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Career

1986	MsC, Vrije Universiteit Amsterdam medical biology
1991	PhD, Vrije Universiteit Amsterdam, department Genetics Prof. dr. J.N.M. Mol Molecular genetics of flavonoid biosynthesis in flowers of petunia
1991-1995	Group leader CPRO (Plant Research International) Molecular genetics of floral organ formation in flowers Plant biotechnology
1995-1998	Head of department Cell Biology Plant Research International The plant as factory for commercially interesting components Plant Biotechnology, flavors and fragrances, fructans, flavonoids
1998-2001	Director Research Plant Research International
2001-2004	Director Swammerdam Institute for Life Sciences, University of Amsterdam (UvA) Professor of Plant Biochemistry, University of Amsterdam (UvA)
2004-present	CEO Keygene

Additional functions
Professor of Plat Biochemistry, University of Amsterdam (UvA), the Netherlands
Visiting professor Shanghai Institute for Biological Sciences, China
Member of board Niaba
Member of the board Europabio
Member of the board Food Valley

CV 48: Maarten Koornneef

Professor
Max Planck Institute for Plant Breeding research Cologne, Germany
Koornneef@mpipz.mgp.de

Career
1974-1976: Head of the horticultural plant breeding division of Vandenberg Seeds Ltd. Naaldwijk, The Netherlands.
1976-1987: Staff member (assistant professor) at the Department of Genetics of the Wageningen Agricultural University.
1987-1992: Senior staff member (associate professor) at the department of Genetics
1992 – until nowadays: Personal chair in plant genetics at the laboratory of Genetics, Wageningen University
2004 – until nowadays: Director at the Max Plant Institute for Plant Breeding Research Cologne – head of department of Plant Breeding and Genetics

Research Interests
We are using genetics in model and crop plants to dissect the genetic basis of traits and natural variation for traits. Arabidopsis is the preferred model plant for these studies. The underlying genes are identified using mutant approaches and quantitative genetics followed by cloning the respective genes. Furthermore molecular population genetics is used to investigate the relevance of variation in nature and to identify how selection in nature takes place. Traits of interest are seed dormancy, growth and abiotic stress.

2-4 Recent Publications
-. Alonso-Blanco C, Aarts MG, Bentsink L, Keurentjes JJ, Reymond M, Vreugdenhil D, Koornneef M (2009): What has natural variation taught us about plant development, physiology, and adaptation? **Plant Cell** 21: 1877-1896
-. Bentsink L, Hanson J, Hanhart CJ, Blankestijn-de Vries H, Coltrane C, Keizer P, El-Lithy M, Alonso-Blanco C, de Andrés MT, Reymond M, van Eeuwijk F, Smeekens S, Koornneef M (2010):
Natural variation for seed dormancy in Arabidopsis is regulated by additive genetic and molecular pathways. **Proc. Natl. Acad USA** 107: 4264-4269.
-. Huang X, Schmitt J, Dorn L, Griffith C, Effgen S, Takao S, Koornneef M, Donohue K (2010):
The earliest stages of adaptation in an experimental plant population: strong selection on QTLS for seed dormancy. **Mol. Ecol.** 19: 1335-1351.
- Keurentjes JJ, Koornneef M, Vreugdenhil D (2008): Quantitative genetics in the age of omics. **Curr. Opin. Plant Biol**. 11: 123-128.

Achieving sustainability II: Breeding tools and strategies

CV 49: Andreas Graner

Andreas Graner
Professor
Leibniz Institute of Plant Genetics and Crop Plant Research (IPK)
Corrensstr. 3, 06466 Gatersleben, Germany

Career

2007- to nowadays:	Managing Director, IPK
1999- to nowadays:	Head of Federal ex situ Genebank, IPK, Professor of Plant Genetic Resources, University of Halle
1997-1999	Senior Scientist, IPK Gatersleben
1990-1997	Research Scientist, Institute for Resistance Genetics, Gruenbach
1987–1989	Post Doc, Botanical Institute, University of Munich

Research Interests

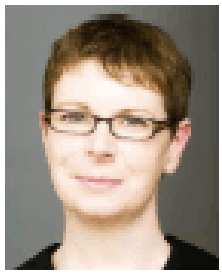
While the genetic diversity of crop plants is increasingly eroded, genebanks serve as repositories to prevent plant genetic resources from getting extinct and to facilitate unrestricted access to them. To valorize Plant Genetic Resources for food, feed and renewable resources, we need to understand the evolution of crop plant genomes, the history and the effects of the domestication and investigate the molecular basis of agronomic plant performance. Therefore, genetic and genomic approaches are being used to develop strategies for an improved utilization of plant genetic resources. In this context, barley (*Hordeum vulgare*) is being used as a model plant for genome analysis on the structural and functional level to study genome evolution and to identify genes that underlie important agronomic traits such as seed quality and disease resistance.

Recent Publications

- Haseneyer, G., Stracke, S., Piepho, H.-P., Sauer, S., Geiger, H.H. & A. Graner (2010) DNA polymorphisms and haplotype patterns of transcription factors involved in barley endosperm development are associated with key agronomic traits**.** BMC Plant Biology, **10**: 5.
- Close, T.J., Bhat, P.R., Lonardi, S., Wu, Y., Rostoks, N., Ramsay L., Druka, A., Stein, N., Svensson, J.T., Wanamaker, S., Bozdag, S., Roose, M.L., Moscou, M.J., Chao, S., Varshney, R., Szucs, P., Sato, K., Hayes, P.M., Matthews, D.E., Kleinhofs, A., Muehlbauer, G.J., DeYoung, J., Marshall, D.F., Madishetty, K., Fenton, R.D., Condamine, P., Graner, A. and R. Waugh (2009) Development and Implementation of High-Throughput SNP Genotyping in Barley. BMC Genomics 10: 582.
- Thiel, T., Graner, A., Waugh, R., Grosse, I., Close, T. J. and N. Stein (2009) Evidence and evolutionary analysis of ancient whole-genome duplication in barley predating the divergence from rice. BMC Evol Biol, 9:209
- Stracke, S., Presterl, T., Stein, N. Perovic, D., Ordon, F. and A. Graner (2007) Effects of introgression and recombination on haplotype structure and linkage disequilibrium surrounding the Rym4 locus for Bymovirus resistance in barley. Genetics, 175:805-817.

Science policy: Plant science in Europe and beyond

CV 50: Patricia Reilly



Member of Cabinet of Commissioner Máire Geoghegan-Quinn
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Career

Patricia qualified as a veterinary surgeon from University College Dublin in 1996, and worked in mixed clinical practice until 2001, when she joined the Irish Department of Agriculture, Fisheries and Food. In 2004 she joined the Irish Embassy in Warsaw as Ireland's first Agricultural Attaché to Poland. On return to the Department of Agriculture in 2008, she re-joined the National Disease Control Centre, where her work involved veterinary international trade policy and contingency planning.
Patricia is a graduate of the Honourable Society of the King's Inns, Dublin, and other academic qualifications include an MSc in European Food Regulation and a Diploma in European Law from the Law Society of Ireland.
Patricia joined the Cabinet of Commissioner Máire Geoghegan-Quinn in February 2010, and is responsible for a range of portfolio topics including the Bioeconomy.

Strengthening the functioning of ecosystems II: Climate change impact on plant production

CV 51: Heribert Hirt

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URGV Plant Genomics, 2 rue Gaston Cremieux, F-91057 Evry, France
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Career

1987-88	Post-doctoral fellow, Biochemistry, Vienna, Microbiology, Oxford
1991	Assist. Prof., Inst. of Microbiology and Genetics, Univ. of Vienna
1994	Habilitation Genetics, Univ. of Vienna
1995	Sabbatical, Molecular Biology, Wageningen,
1997	Associated Professor, Inst. of Microbiology and Genetics, Vienna
99-01	Vice-chair, Inst. of Microbiology and Genetics Vienna
00-03	Dean of International PhD program, Vienna Biocenter
00-03	Vice-Director, Gregor-Mendel-Institute, Austrian Academy of Sciences
06-07	Head of Department, Plant Mol. Biology, Vienna
08-present	Director; URGV Plant Genomics, Evry, France

Research Interests

Plants perceive environmental stresses in different ways, such as by membrane located receptors or intracellular proteins. Stress information is transmitted by signal cascades into altered gene expression programmes ultimately resulting in altered physiological responses and metabolic adjustment. Plants have evolved distinct mechanisms by which tolerance against different stresses can be achieved. Knowledge about the signal transduction pathways induced by different stresses is essential to improve plant tolerance to distinct abiotic and biotic stresses. Using genomic, transcriptomic and proteomic technologies, we identify the sensing and signaling mechanisms of environmental stresses in the model plant Arabidopsis and use this knowledge to improve stress tolerance of crops.

Recent Publications

1. Djamei, A., Pitzschke, A., Nakagami, H., Rajh, I., and Hirt, H. (2007) Trojan horse strategy in Agrobacterium transformation by abusing MAPK defence signalling. *Science*, **318,** 453-456.
2. Schikora, A., Carreri, A., Charpentier, E., Hirt, H. (2008) The dark side of the salad : *Salmonella typhimurium* overcomes the innate immune response of *Arabidiopsis thaliana* and shows an endopathogenic lifestyle. *PLOS One*, **3**:e2279.
3. Pitzschke, A., Djamei, A., Teige, M., Hirt, H. (2009) VIP1 response elements mediate mitogen-activated protein kinase 3-induced stress gene expression. *Proc. Natl. Acad. Sci. USA*, **106**:18414-9.
4. Pitzschke A, Hirt H.(2010) New insights into an old story: Agrobacterium-induced tumour formation in plants by plant transformation. *EMBO J.* **29**:1021-32

Strengthening the functioning of ecosystems III: Climate, ecosystems and genomics

CV 52: Gail Taylor

To come

Achieving quality V: Plants with improved nutritional quality and value

CV 53: Michal Oren-Shamir

Researcher
Volcani Center, Agriculture Research Organization (ARO), Bet-Dagan, Israel
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Career

- Research Scienties, Department of Ornamental Horticulture, Volcani Center (since 1995)
- Research advisor, Prof. Avigdor Scherz, Biochemistry Department, the Weizmann Institute (since 1995)
- Visiting lecturer, Agriculture Faculty, The Hebrew University of Jerulsalem (since 1996)
- Visiting researcher, Prof. Eduardo Blumwald's lab, Plant Sciences Department, UC Davis (since 2009)
- Visiting researcher, Prof. Milton Gordon's lab, Biochemistry Department, University of Washington, Seattle (1997-1998)

Research Interests

My main research interest is the study of stability and degradation of anthocyanins in plants. In contrast to the detailed knowledge on the biosynthesis of anthocyanins in plants, very little is known about the stability and degradation of these pigments in the plant tissue. We discovered that the degradation of anthocyanins in *Brunfelsia calycina* flowers is dependant on newly synthesized genes and proteins, after flower opening and before the onset of senescence, and established *Brunfelsia* as a model plant for studying anthocyanin degradation. A second research interest is devloping treatments that increase the stability of anthocains in growing fruit and flowers, resulting in increased pigmentation.

Recent Publications

Bar-Akiva A., Ovadia R., Rogachev I, Bar-Or C., Bar E., Freiman Z., Nissim-Levi A., Gollop N., Lewinshon E., Aharoni A., Weiss D., Koltai H and Oren-Shamir M. (2010) Metabolic networking in Brunfelsia calycina petals after flower opening. **Journal of Experimental Botany** 61, 1393-1403.

Oren-Shamir M. (2009) Does anthocyanin degradation play a significant role in determining pigment concentration in plants? **Plant Science** 177, 310-316.

Vaknin H., Bar-Akiva A., Ovadia R., Nissim-Levi A., Forer I., Weiss D. and Oren-Shamir M. (2005) Active anthocyanin degradation in Brunfelsia calycina (Yesterday-Toda-Tomorrow) flowers. **Planta**, 222, 19-26.

Achieving quality II: From photosynthesis to solar fuels

CV 54: Eva-Mari Aro

Professor
Department of Biochemistry and Food Chemistry, Univ Turku, Finland
evaaro@utu.fi

Career
1998- Professor in Physiological Botany, Univ Turku, Finland
1998-2008 Academy Professor, Academy of Finland
1987-1998 Associate Professor in Physiological Botany, Univ Turku, Finland
1977-1987 Junior Researcher

Research Interests
We aim at systems level understanding of the photosynthetic light harvesting and electron transfer mechanisms, and how they are integrated with downstream metabolic processes in chloroplasts and at cellular level. Biogenesis and structural analysis of the multi subunit thylakoid membrane protein complexes and their biophysical properties in direction of electrons, originating from water splitting, to various electron acceptors are in focus of our research along with the retrograde signaling mechanisms leading to optimized growth and development of plants and cyanobacteria. An applied aspect of our research, intimately linked to photosynthetic light harvesting and conversion of solar energy into chemical energy, is to harness cyanobacterial cells for large scale photobiological production of biohydrogen and carbon-based biofuels.

Recent Publications

Lintala, M., Allahverdiyeva, Y., Kangasjärvi, S., Lehtimäki, N., Keränen, M., Rintamäki, E., Aro, E.M. & Mulo, P. (2009) Comparative analysis of leaf-type ferredoxin-NADP+-oxidoreductase isoforms in Arabidopsis thaliana. The Plant Journal 57: 1103-1115.

Sirpiö, S., Allahverdiyeva, Y., Holmström, M., Khrouchtchova, A., Haldrup, A., Battchikova, N. & Aro, EM. (2009) Novel nuclear-encoded subunits of the chloroplast NAD(P)H dehydrogenase complex. - J Biol Chem. 284: 905 - 912.

Tikkanen, M., Grieco, M., Kangasjärvi, S., Aro, EM. (2010) Thylakoid protein phosphorylation in higher plant chloroplasts optimises electron transfer under fluctuating light. - Plant Physiology 152:723-735

Keynote

CV 55: Olivier Voinnet

To come