



Fondation Francqui-Stichting

Fondation d'Utilité Publique - Stichting van Openbaar Nut

Ceremony of the Francqui Prize by his Royal Highness Prince Philippe on the "Fondation Universitaire" at June 29, 2005

Curriculum Vitae - Research activities - Report of the Jury



Dirk Inzé

Curriculum Vitae

Dirk Inzé is part-time Professor at the Ghent University and Scientific Director of the Department of Plant Systems Biology at the Flanders Interuniversity Institute for Biotechnology (VIB, Ghent, Belgium) where he heads a group of 245 employees. Professor Inzé's ambition is to make the Department of Plant Systems Biology a centre of excellence with emphasis on systems biology of plant growth and development.

Dirk Inzé graduated in 1979 in Zoology at the Ghent University and in 1984 he received his Ph.D. in Zoology from the same university with a thesis on the mechanisms by which *Agrobacterium tumefaciens* causes the proliferation of plant cells. In 1990, he was appointed Research Director of the French National Institute for Agricultural Research (INRA) at the Ghent Joint Laboratory, where he initiated extensive research programs on the cell cycle and cell death in plants. In 1995, he became Professor at the Ghent University. In 1998, he founded the biotechnological research company CropDesign that was acquired by BASF Plant Science in 2006 and is currently one of the most active players in high-throughput analysis of plant genes in cereals. In 1999, he was appointed Deputy Scientific Director of the Department of Plant Systems Biology of the VIB and he became Director of the Department in July 2002.

In 1994, Professor Inzé was laureate of the Körber Stiftung Prize and in 2003 he became EMBO member. He has served on numerous scientific committees,

has been appointed Visiting Research Professor at the De Montfort University (Leicester, U.K.) and the University of Plovdiv (Bulgaria), and has been an Honorary Research Associate of the Institute of Grassland and Environmental Research (Aberystwyth, U.K.).

Professor Inzé's research focuses on the understanding of the basic cell cycle machinery in plants and how the cell cycle is regulated by both developmental signals and environmental cues.

Professor Inzé is member of the editorial or advisory boards of The Plant Journal, Journal of Experimental Botany, Plant Physiology, Plant Biotechnology, The EMBO Journal, Plant and Cell Physiology.

According to a recent survey of ISI Essential Science Indicator (Thomson), he is one of the most cited and influential researchers in his field.

Professor Inzé has published 318 articles in Scientific Journals with referees' reports, 21 chapters in books and 39 proceedings of congresses. Professor Inzé has also been invited to give numerous lectures at international symposia.

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Research activities

Professor Dirk Inzé has made two very important contributions to plant biology. In the eighties he and his co-workers have performed extensive research into the mechanisms by which plants protect themselves against unfavourable growth conditions such as cold temperatures and water deficit. He identified genes that are of fundamental importance in the resistance of plants.

The last 15 years Professor Inzé has done intensive research into the cell division in plants. Plants are built of billions of cells. During their life cycle, plants continuously form new cells in their meristems which organise themselves to new leaves, stems, flowers, seed and other structures. This increase in number of cells is therefore the most important factor that contributes to the form of plants and to the speed by which they develop. Cells can multiply by a complex molecular mechanism that makes sure that the DNA present in a cell is perfectly copied and then divided over the two daughter cells.

Professor Inzé and his co-workers have contributed extensively to the elucidation of the molecular processes that control cell division in plants. He showed that a number of elements in the molecular control system are comparable to the mechanisms that control cell division in humans. Although plants and animals started to evolve separately more than a billion years ago, the basic mechanisms of cell division seem to have been partially conserved.

Professor Inzé recently found new genes in plants that now seem to play a role also in the cell division in humans. As a derailment of the cell division process in humans leads to cancer, the research of cell division in plants is also very important in the medical field.

The team of Professor Inzé is a world leader in the research of the cell cycle in plants. Professor Inzé has the ambition in the next years, to further extend the knowledge of the mechanisms that control cell division and yield in plants. Biological processes are extremely complex and during the last years scientists came to the conclusion that new approaches are necessary to understand this complexity. Professor Inzé has been heading, during the last 6 years, the "Department of Plant Systems Biology" of the University of Ghent and the Flanders Institute for Biotechnology (VIB). With his co-workers he aims to unravel the complex processes by which plants regulate cell division and growth.

The approach that is used is called Systems Biology, a brand new field in Biology, where accurate models are made of complex processes using a combination of molecular biology, high throughput functional studies and bioinformatics. Professor Inzé is interested in the way the cell cycle is integrated in the development of plants. This research is not only of great importance from a fundamental point of view but also has immense economic potential. The elucidation of the growth processes in plants is an important step forward to obtain plants with considerable higher yield.

Professor Inzé is convinced that plants play an important role in building a sustainable economy. Plants have the potential to offer partial solutions to the challenges that man has to face in the next 100 years. The most important challenges are delivering high qualitative food for the exponentially growing world population, securing enough water supplies, safe guarding of biodiversity and finding a solution for the rapidly decreasing world oil reserves. Professor Inzé illustrates this by two examples:

Supplying the world with enough food is a big challenge. The current world population of 6.6 billion people grows with 80 million a year. Already now we are not capable of providing enough food and a minimum of life standard to 1 billion people and these problems will become more critical when the world population will have grown till 8 to 11 billion in 2050. An enhanced food production, made possible by molecular research of plants, will contribute to a large extent to solve this urgent problem.

Research into the cell division and growth in plants has lead, under the impulse of VIB, to the establishment of the biotech company CropDesign. CropDesign, which was in 2006 acquired by BASF plant Science, has identified a number of plant genes that, after introduction into rice plants, enhanced the yield considerably. According to Professor Inzé there is no doubt that these findings will have an enormous impact on the world food production.

Oil is a natural carbon containing raw material and it is known to everyone that in 2060 the world petroleum reserves will be almost exhausted. Oil is not only used as fuel but is also the basis of many derived products such as plastics. The impact of the decreasing oil reserves on our oil-driven economy is already shown by the high oil prices. How can plants offer a solution to this problem? One of the raw carbon containing materials that shows an alarming increase is carbon dioxide. Plants transfer carbon dioxide into biomass in a process called photosynthesis. The energy that is captured in this way can be transformed

into renewable materials and fuels such as ethanol and bio-diesel.

Combustion of bio-ethanol and bio-diesel releases again the energy with carbon dioxide as only rest product. The carbon dioxide is then again fixed by the plants. In this way plants can be used to obtain an ecologic and sustainable energy production. The US Department of Energy (DOE) aims at getting 50% of all carbon containing energy out of plants, whereas now most of it is delivered by oil. Extensive research into the mechanism by which plants fix carbon dioxide and transform it into biomass will undoubtedly allow to optimise these processes. The research group of Professor Inzé is spear-heading the research into the mechanisms that control biomass and it is their ultimate ambition to make major contributions to the production of plants that can be used much more efficiently for the production of carbon containing materials and fuels.

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Report of the Jury (April 2, 2005)

Dirk INZE is the recipient of this year's FRANCOU PRIZE for Biological and Medical Sciences. Dr. INZE is a plant biologist from the University of Gent and the Flemish Institute of Biotechnology. His work has centred on the responses of plants to oxidative stress and the impact of control of cell division on plant development.

Dr. INZE's work on the field of plant sciences has wide implications because cell division is common to all of life. He is therefore a fitting recipient of this prestigious prize and a true ambassador for Belgian science.

His discoveries have led to a better appreciation of the survival and growth of plant life in adverse conditions. This has major implications for agriculture and the development of hardier and more productive plants that are likely to become increasingly important as our need for food and alternative energy supplies increases.

The central question Dr. INZE and his team addressed was whether cell division drives growth and development or follows a genetic plan. Together with his team he showed conclusively that disturbed cell division has no major impact on plant form and function. Their results strongly favour a dominant genetic influence on development.

Dr. INZE has had the foresight to translate these fundamental scientific results into industrial products. His work illustrates the importance of outstanding basic scientific discoveries in the elaboration of new practical advances of use to society at large.

Jury members :

Professor Jesse ROTH

Professor Dr. M.D., FACP

Professor of Medicine, Albert Einstein College of Medicine, Geriatrician-in-Chief, North Shore-Long Island Jewish Health System, Formerly, Scientific Director of Diabetes Branch Chief, National Institute of Diabetes and Digestive & Kidney Diseases, NIH, Bethesda, Formerly, Raymond and Anna Lublin, Professor of Medicine, Johns Hopkins University School of Medicine

New York - USA

Chairman

and

Professor Leif ANDERSSON

Uppsala Biomedical Center
Uppsala University
Sweden

Professor Rudi BUSSE

Institut fuer Kardiovaskulaere Physiologie
Klinikum der J.W. Goethe-Universitaet
Frankfurt am Main
Germany

Professor Jean-Charles CEROTTINI

Director Lausanne Branch
Ludwig Institute for Cancer Research
Epalinges - Switzerland

Professor Richard FRACKOWIAK

Functionnal Imaging Laboratory
Londen - UK

Professor Willem GRUISSEM

Institute of Plant Sciences
Swiss Federal Institute of Technology
Zurich - Switzerland

Professor Virginia LEE

Director Center for Neurodegenerative Disease Research
University of Pennsylvania School of Medicine
Philadelphia - USA

Professor Sten ORRENIUS

Professor emeritus Institute of Environmental Medicine
Karolinska Instituted
Stockholm - Sweden

Professor Olli SILVENNOINEN

Institute of Medical Technology
University of Tampere
Finland

Professor Ivo TOUW

Erasmus University Medical Center
Rotterdam - The Netherlands

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