

Awarded for new methods of gene discovery in trees?

Description

A pioneer in molecular genetics of forest trees

The development of gene discovery in conifer species is being awarded The 2017 Marcus Wallenberg Prize. Professor Ronald R. Sederoff received his diploma from the hands of His Majesty the King of Sweden at a ceremony in Stockholm, Sweden, on Thursday 26 October.

Many scientists believed that working on tree genes was too difficult. Professor Ronald R. Sederoff, North Carolina State University, USA, however saw the potential and became one of the first scientists in the field of molecular genetics of forest trees. From the early 1990s he was involved in almost all the early studies on genetic modification of conifer trees, quantitative genetic studies and later also tree genomics. He has also exploited new breeding technologies for improved properties. For his discoveries Ronald R. Sederoff is awarded the 2017 Marcus Wallenberg Prize of SEK 2 million. – I am deeply grateful, says Ronald R. Sederoff.

Innovations for the forest industry

Ronald R. Sederoff established in 1988 the Forest Biotechnology Group at North Carolina State University to concentrate on the genetic basis of quantitative traits in trees. Until then tree breeding had focused on understanding the inheritance of different qualities, without actually caring about the actual genes that determined these traits.

Ronald R. Sederoff was one of the first scientists trying to link biological properties with genetic information in trees, so called genetic mapping, using the newest markers available to identify important characteristics like rust resistance, growth and quality.

– The area of genetics was greatly hindered by the long generation times and large size of the experimental material. The advent of genome sequencing increased the potential of identifying and characterizing large groups of genes and their products. The new technology has become even more powerful through the introduction of gene editing, which is a more direct method of altering genes, Ronald R. Sederoff explains.

In his group the scientists have been actively working on sequencing pine and American chestnut genomes. They have also specialized on the molecular basis of the structure of wood to investigate the biochemical and genetic basis of cell wall formation. Their focus is on the pathway for lignin biosynthesis and cell wall structural proteins.

Ronald R. Sederoff has also provided the forestry sector with new methods and applications for tree breeding as well as valuable information to be used in the restoration of for example the American chestnut, which is today on the verge of extinction due to a devastating fungal disease.

Several of the inventions in his group have been granted as patents in the US.

A rapidly developing field

The Marcus Wallenberg Prize is awarded once a year to a path breaking scientific achievement with importance to forestry and forest industries. Ronald R. Sederoff considers the prize as an important stimulation to investigators around the world to use trees as their experimental material.

– One benefit of the prize is that it gives young scientists more confidence to try new things and realize that problems that appear difficult at first are often easier than expected. It is important to think beyond what is obvious. It is in the more challenging work that new discoveries are made.

Ronald R. Sederoff has always tried to encourage his students to take the less travelled road and look for something new.

– The future of the field of tree genomics depends on attracting brilliant students who will accept the intellectual challenge of difficult systems. The new genomic technology makes the work possible, he says.

The Laureate

Ronald R. Sederoff, born in 1939, received a Bachelor of Arts in Zoology in 1961 at the University of California, UCLA, USA, where he also received a Master of Arts in Zoology in 1963 and a Doctor of Philosophy in Zoology in 1966 – both in Genetics.

He was 1967-1969 a Post-doctoral Fellow at the University of Geneva, Switzerland, and 1975-1978 held Associate and Assistant Professor positions at Columbia University, the University of Oregon and the Department of Genetics at North Carolina State University – all in the USA. For the next two years he held a Senior Scientist and Plant Molecular Geneticist position at the USDA Forest Service. In 1987 he became a Professor in the Department of Forestry and Environmental Resources at NCSU, where he also held associated faculty status in Genetics and in Molecular and Structural Biochemistry. He is currently Emeritus Distinguished University Professor and Edwin F. Conger Professor of Forestry and Environmental Resources at NC State University.

Professor Sederoff was in 1995 elected to the National Academy of Sciences, USA, appointed Adjunct Professor Nanjing Forestry University in 1997, appointed as an Honorary Research Professor, Chinese Academy of Forestry in 1998, elected as a Fellow of the International Academy of Wood Science in 2000, became a Fellow of the American Association for the Advancement of Science in 2003 and was awarded an Honorary Doctorate from the Swedish University of Agricultural Sciences in 2004.

The Marcus Wallenberg Prize

The purpose of the Marcus Wallenberg Prize is to recognize, encourage and stimulate path breaking scientific achievements, which contribute significantly to broadening knowledge and to technical development within the fields of importance to forestry and forest industries. The prize will be awarded at a ceremony in October in Stockholm, Sweden.

The official citation and prize motivation is published on <https://mwp.org/awarded-for-new-methods-of-gene-discovery-in-trees/>

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