Torgny NÃ¤sholm receiving the 2018 Marcus Wallenberg Prize

Description

**The 2018 Marcus Wallenberg Prize of SEK 2 million is awarded to Professor Torgny NÃ¤sholm for his groundbreaking research of the role of organic nitrogen in the nutrition of trees.
King Carl XVI Gustaf presented the prize on Monday 24 September.**

Professor Torgny NÃ¤sholm, the Swedish University of Agricultural Sciences, UmeÃ¥, Sweden, has examined the role of amino acids in supplying the nitrogen required for the growth of forest trees. His work has caused a breakthrough in explaining the nutrition of plants.
For his discoveries Torgny NÃ¤sholm is awarded the 2018 Marcus Wallenberg Prize. He received his diploma from the hands of His Majesty the King of Sweden at a ceremony in Stockholm, Sweden, on Monday 24 September 2018.
â?? I feel happy and honoured to be rewarded, Torgny NÃ¤sholm said.

With a little help of amino acids
The ability of boreal forests to take up atmospheric carbon dioxide and produce wood depends on the availability of nitrogen in the soil. The growth of most forests is however limited by a low supply of nitrogen.
Some species have developed symbioses with bacteria that can process nitrogen gas into amino acids. More than a century ago some plants were demonstrated to have the capability of taking up amino acids directly. The process was not considered important until the isotopic methods were further developed and could simplify chemical analyses of different elements.
Torgny NÃ¤sholm has in different studies since 1998 investigated the nutrition of forest trees â?? particularly Scots pine and Norway spruce. He found that nitrogen from amino acids was taken up by tree seedlings and discovered that the amino acid concentrations in forest soils are high enough to provide a substantial supply for tree uptake. He could also testify that the major nitrogen source of pine and spruce in boreal forests is amino acids rather than ammonium ions or nitrate.

Environmentally friendly
The new insights inspired Torgny NÃ¤sholm to develop fertilizers based on amino acids. Field studies revealed the improvement of shoot and root growth when seedlings were grown on this organic nitrogen source. Leaching of nitrogen during seedling cultivation in nurseries was also reduced significantly compared to conventional inorganic fertilizers.
The findings have had an impact on nursery and forestry practices in coniferous forests in the Nordic countries.
The first patent for this approach was issued in 2000 and a fertilizer called Argrow, based on the amino acid arginine, was introduced on the market. Arginine is a nitrogen rich amino acid that is rapidly absorbed by plants. The fertilizer is mainly used in forest nurseries in Sweden, and tests have been performed in Finland, USA, Canada, Uruguay, China, New Zealand and Australia. It is also being tested on other commercial crops and garden plants.
The innovation has been further developed and a new category of patented, slow release fertilizer based on arginine is currently being tested in large scale field trials in Finland and Sweden. The results

are very promising, according to Torgny NÃ¤sholm.
Seedpad is an example of another new technology for improved germination of pine and spruce seeds, that Arevo AB, UmeÃ¥, Sweden recently developed. Torgny NÃ¤sholm is the CEO for this company.

Paradigm shift
The Prize Selection Committee of the Marcus Wallenberg Foundation states in its motivation that Torgny NÃ¤sholm has made innovative discoveries with substantial practical importance to a sustainable management of forests. He has managed to translate and transfer his scientific discoveries into useful applications.
Marcus Wallenberg, chairman of the Marcus Wallenberg Foundation, stated in his presentation speech that Torgny NÃ¤sholmâ??s research is valuable for the forest-based sector.
â?? His findings have led to a paradigm shift in the understanding of the ecosystem in forest trees. He has also developed effective and environmentally friendly fertilizers, Marcus Wallenberg said.
King Carl XVI Gustaf, Queen Silvia and 350 other guests from several countries were invited to the prize ceremony and banquet at the Grand HÃ´tel, Stockholm. A group of 31 junior scientists participating in an extended Young Researcherâ??s Program during four days in the Swedish capital also enjoyed the evening.
The science behind this yearâ??s prize and its importance for applications in the forest-based sector will be the topic of a symposium in Stockholm on 25 September 2018.

The Laureate
Torgny NÃ¤sholm was born in Nora, the municipality of Kramfors, Sweden, in 1959. He defended his PhD thesis in Plant Physiology in 1991 at the Swedish University of Agricultural Sciences in UmeÃ¥, Sweden. In 2000 he was appointed Professor in Plant Physiology at the Faculty of Forestry, and in 2007 Professor in Tree Ecophysiology at the same university.
Between 2007 and 2010 Torgny NÃ¤sholm was engaged in SweTree Technologies AB, where he still holds a position as scientific advisor and board member. He is also the leading scientist and CEO of Arevo AB. Both companies are focused on plant and forest biotechnology and situated in UmeÃ¥.
Since 2007 Torgny NÃ¤sholm has published 64 scientific articles, many of them in the highest ranked journals of his area of research. He is also the lead scientist on ten patents issued for work on applications of amino acid nutrition for plants.

The press release 2018-09-25 in English.
The press release 2018-09-25 in Swedish

The official citation and prize motivation is published here.

Encouraging research in forestry
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.