

The role of plant breeding in forestry: Magnus Hertzberg

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Since the first report of its programmable gene editing potential, the CRISPR-Cas9 technology is revolutionizing all facets of biology, from medicine to agriculture. For woody perennials such as forest trees, fruit/nut trees and woody ornamentals, CRISPR-Cas9, in concert with other advanced breeding technologies, affords a simple mean to accelerate genetic improvement, says Mr. Magnus Hertzberg, Chief Scientific Officer at SweTree Technologies.

SweTree Technologies (STT) is a leading company in the field of modern forest biotechnology founded by researchers in public sector. STT's vision is to be a world-leading provider of technologies for improved seedlings and trees and to provide the technical, biological and economical means to increase production and the preservation of nature in forestry.

Forestry is the science of creating, managing, using, conserving, and repairing forests for human and environmental benefits. What are the main trends in the forestry sector?

The rapid rate of climate change put pressure on forest production and may overcome the natural ability of forest ecosystems to adapt. Therefore from a plant breeding point of view, an important trend in plantation forestry is climate adaptation.

This could mean improving protection against rain and water shortage or surplus but also insects and pests protection. Another trend is represented by using plant breeding to improve the quality aspects of tree products, like wood and fibres. These products can ultimately become resources for the biorefining sector, the process of turning biomass into bio-based products (food, feed, chemicals, materials) and the bioenergy sector (biofuels, power and/or heat).

What is the connection between plant biotech and the development of forestry?

Plant breeding is crucial for the development of forestry, not only in increasing yields, but also to secure yields in view of climate change. These results could also be obtained in the past, but

with advanced breeding methods such as NBTs it's easier to obtain more products with fewer resources.

What are the plant breeding techniques that are most promising in your field?

Well, surely, looking at NBT's, cisgenesis and insertion techniques based on tailor-made site-directed nucleases (SDNs) are very interesting tools. With the development of targeted genome editing technologies, it is becoming feasible to advance genetic diversity in crops in a predictable manner.

However one of the main reasons for which plant breeding is so important in our field is the regulatory framework. European regulations on biotech are very stringent and they are blocking innovation. Breeding techniques such as CRISPR-Cas9 can modify genomes of living organisms at precise locations in specific ways and more cost-effectively than previously possible. This is already challenging the international regulatory landscape and urges policy-makers to enable a fair playing field for all operators, including small enterprises.

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Mr. Magnus Hertzberg, Chief Scientific Officer at SweTree Technologies, has a PhD in Plant Molecular Biology from 2001. He has +20 years of experience in plant biotechnology and has worked for SweTree at different management positions. Magnus was appointed as CSO in July 2015.

What is plant breeding?

Plant breeding is the art and science of changing the traits of plants in order to produce desired characteristics to improve the overall function of various plants and crop systems.

With the predicted growth in the global population and the effects of climate change, varieties with increased yields and resistance to drought and disease are critical if we are to provide enough food for future generations. Plant breeding is one of the tools that will help us achieve sustainable crop production in the long term.

About the NBT Platform

The NBT Platform is a coalition of SMEs, large industry representatives and members of prominent academic and research institutes. Its aim is to provide policy makers and stakeholders with clear and precise information on NBTs and to generate awareness about their benefits for the European economy and society.

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