

Scientists predict economically important traits of crops

September 21 2020



Researchers of SPbPU developed a new mathematical model to predict economic performance of crops. Credit: Peter the Great St. Petersburg Polytechnic University

Researchers from Peter the Great St. Petersburg Polytechnic University

(SPbPU) have developed a new mathematical model to predict economic performance of crops. It can assist breeders to produce the plants with the highest possible quality. The research results were presented at the fifth Plant Genetics, Genomics, Bioinformatics, and Biotechnology (PlantGen2019) conference, and published in *BMC Genetics*.

"We have developed a new [mathematical model](#) for predicting crop [phenotypic traits](#) as a function genotype," says Maria Samsonova, head of the Laboratory of Mathematical Biology and Bioinformatics at SPbPU. She adds that such models in agriculture are called genomic selection models. It is very difficult to create a new variety of plant, usually taking on the order of 10 to 12 years. Using genomic selection models, this process can be accelerated several times. "Our mathematical model, based on machine learning methods, performs better than modern analogs as it contains a significantly smaller number of parameters."

Scientists applied the model to predict phenotypic traits of an important crop, soybean. Among the traits, they analyzed plant height, number of seeds per plant, yield, protein and oil content in seeds.

"For breeders, it is very important to select parental [plants](#) able to produce offspring of high quality," says Anna Igolkina, engineer of the Laboratory of Mathematical Biology and Bioinformatics at SPbPU. "Due to the small number of parameters in our [model](#), we can rank breeding pairs according to offspring quality and selected advanced parental pairs representing new potentially interesting donors of desired traits."

More information: Anna A. Igolkina et al, Multi-trait multi-locus SEM model discriminates SNPs of different effects, *BMC Genomics* (2020). [DOI: 10.1186/s12864-020-06833-2](https://doi.org/10.1186/s12864-020-06833-2)

Provided by Peter the Great Saint-Petersburg Polytechnic University

Citation: Scientists predict economically important traits of crops (2020, September 21) retrieved 25 April 2024 from

<https://phys.org/news/2020-09-scientists-economically-important-traits-crops.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.