Растителна защита
електронно списание за растителна защита
семена, торове и земеделие
ISSN 2815-522X

Доматите – истинско генетично чудо

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Date: 14.11.2020 *Issue:* 11/2020

An international team of scientists from Brazil, the USA and Germany created about a year ago a tomato using CRISPR-Cas9 genome editing. The new tomato variety, which has increased lycopene content, was developed from a wild plant and only within a single generation.

The researchers used as a parental species Solanum pimpinellifolium – a wild tomato from South America and ancestor of the modern cultivated tomato, whose fruits are the size of peas and the yield is minimal, but they are highly aromatic and their lycopene content is impressive.

The international team of experts modified the basic wild tomato by applying CRISPR-Cas9 genome editing, as the resulting plants carry small genetic modifications in six genes that are key for tomato domestication.

ISSN 2815-522X

The modified tomato has fruits three times larger than the wild one. This corresponds to the size of cherry tomatoes. It has 10 times more fruits, and their shape is oval, unlike the round wild fruits (an important trait, because in case of rainfall round fruits split faster than oval ones). The plants also have more compact growth. The new tomato variety has a very high content of the carotenoid pigment lycopene, which is a powerful antioxidant and protects the organism from oxidative stress. The thus bred plant has twice the content of the beneficial pigment compared to its wild parent and five times more than its modern counterparts – cherry tomatoes.

According to an article published in January 2019 in the journal „Trends in Plant Science“, with the new genome editing techniques it is also possible to create a tomato competitive with some of the hottest chili peppers. The results of whole-genome sequencing in tomatoes show that this vegetable crop has the genes for pungency, but does not possess the mechanism by which these genes can become active. Thus, through CRISPR-Cas9 it is possible to create tomatoes synthesizing capsaicinoids, claim the researchers who are currently working on this project. The aim is not to satisfy the growing culinary niche, but to increase the production of capsaicinoids for commercial purposes. The active substance of hot peppers (capsaicin) is known for its antibiotic and analgesic properties and for its protection against pests.

The article is part of the content of issue 10/2020 of the magazine “Plant Protection”