

New discovery about how flowering time of plants can be controlled

December 7 2010

Researchers at Umeå Plant Science Center in Sweden discovered, in collaboration with the Syngenta company, a previously unknown gene in sugar beets that blocks flowering. Only with the cold of winter is the gene shut off, allowing the sugar beet to blossom in its second year. The discovery of this new gene function makes it possible to control when sugar beets bloom. The new findings were recently published in the prestigious journal *Science*.

Scientists at Umeå Plant Science Center and the international company Syngenta, in a joint study of genetic regulation in the sugar beet, have discovered an entirely new principle for how flowering can be controlled. The study, which was co-directed by Professorn Ove Nilsson, of the Swedish University of Agricultural Sciences (SLU), and Syngenta scientist Dr. Thomas Kraft, showed that there is a gene in the sugar beet that was previously unknown.

"When we studied a gene in the sugar beet that usually stimulates blooming in other [plants](#), we made a very surprising discovery: in the sugar beet evolution has developed a 'sister gene' that has taken on the exact opposite function, namely, to inhibit blossoming. For biennial sugar beets this means that they can't flower in their first year. Once the plants have been exposed to the cold of winter at the end of the first year, the 'gene blockade is lifted,' and the sugar beets can bloom in their second year of life," says Ove Nilsson about the function of the newly discovered flowering gene.

The researchers speculate that the development of the inhibiting sister gene was an important factor in enabling biennial sugar beets to evolve from an annual to a biennial plant. Furthermore, plant researchers in Umeå and Landskrona have shown that it is possible to manipulate the "flowering gene" in such a way as to leave the gene constantly "turned on," that is, to block blooming, and thereby prevent it from being turned off after winter.

"In that way it's possible to fully control the [flowering time](#) of the sugar beet. This enables us to develop a so-called 'winter beet,' that is, a sugar beet that can be planted in the autumn and then will continue to grow throughout the following growth season without blossoming," says Thomas Kraft at Syngenta Seeds.

"A winter beet has been a high priority for sugar beet growers, since it is estimated to be able to increase the yield by about 25 percent and at the same time allow a more extended harvesting period. Traditional breeding has failed to produce such a plant. Syngenta Seeds is now going to move on to more in-depth tests of this potential new winter beet."

More information: Pierre A. Pin, Reyes Benlloch, Dominique Bonnet, Elisabeth Wremerth-Weich, Thomas Kraft, Jan J. L. Gielen, Ove Nilsson. An Antagonistic Pair of FT Homologs Mediates the Control of Flowering Time in Sugar Beet. *Science*, 3 December 2010.

Provided by Swedish Research Council

Citation: New discovery about how flowering time of plants can be controlled (2010, December 7) retrieved 10 April 2024 from <https://phys.org/news/2010-12-discovery.html>

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