WAGENINGEN UNIVERSITY
PLANT SCIENCES

Isolation and functional analysis of the *Co* gene for a columnar architecture of apple trees

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History

Columnar-type growth

Due to dominant mutation in McIntosh ‘Wijcik’ apple, columnar apple trees have very little side branches (spurs are formed instead), a thick stem, short internodes and fruits are produced close to the stem.

Benefits of columnar growth

-Greatly reduces the need for pruning
-Increased yield through high density planting
-Easier application of chemicals
-Automation of apple picking

Current status

Crossing experiments have been carried out in Italy (IASMA), using Golden Delicious x McIntosh ‘Wijcik’ to generate a large segregating population for the columnar phenotype.
The genomic region of the *Co* gene in McIntosh ‘Wijcik’ has been reduced to ~800 Kbp.
A BAC library for McIntosh ‘Wijcik’ has been generated.

Aim of the project

Isolation of the *Co* gene

-Compare sequences of McIntosh ‘Wijcik’ and standard McIntosh by analyzing BAC libraries to find the mutation in the *Co* gene
-Clone candidate *Co* genes

Functional analysis of the *Co* gene

-Expression analysis of candidate genes in standard trees and columnar trees
-Verification of gene function by transforming *Arabidopsis* with candidates for the *Co* gene.
-Performing experiments in *Arabidopsis*, based on the candidate *Co* genes identified.

End Products

-Perfect marker for columnar growth for marker assisted selection
-Understanding of the physiological background of columnar trees
-Availability of the *Co*-gene for application in apple breeding, using cisgenesis

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