



Bundesministerium
für Ernährung
und Landwirtschaft

Bilateral Cooperation of BMEL with the State of New Zealand

Project acronym: **AppleClimateBreeding**

Country	Germany and New Zealand
Funding Agency	Federal Ministry of Food and Agriculture - BMEL
Project executing Agency	Federal Office for Agriculture and Food – BLE
Project Budget	99.828,00
Project Duration	01.03.2020-28.02.2022
Key Words	Dormancy, apple breeding, climate change
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Short Description

Climate change is already impacting on flowering, hence increasing the risk of crop failures in Germany and New Zealand. Whereas in Germany a shift towards earlier flowering can be observed to a period where night frosts can lead to losing a complete crop, in New Zealand winters are becoming too mild for proper flowering because of too few chilling units. In this project, we will initiate research on the contribution of QTL and candidate genes (CGs) to flowering time, starting with known ones and continue with the detection of further genetic factors ruling chilling requirements (bud dormancy release), heat requirements (bud break), and flowering time. The knowledge gained within this project will finally be used to develop molecular markers for breeding. The entire project is based on two complementary approaches (Figure S1) focusing on the same goal. The first approach based on QTL mapping using a F1-population segregating for flowering time. The German partner will do this. The second approach based on genome-wide association studies (GWAS). The New Zealand partner will do this. CGs already known from the literature will be validated and evaluated for allelic variation. The obtained information will be integrated into both aforementioned approaches. Both partners will do this together. The partners will jointly develop the experimental setup for both approaches, discuss the phenotyping and genotyping strategies, collaborate in CGs sequencing and functional validation and share all information and results. They will also collaborate in marker development and validation. The outcomes of this research will enable the selection of new apple cultivars adapted to climate change.