Application of molecular marker assisted selection in developing common bean varieties with improved multiple resistances to the major diseases in Uganda.

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Overview

Dr Namayanja led the KT-funded bean marker assisted selection (MAS) improvement programme in NACRRI, Uganda, since its inception in 2008 until 2018. The programme aimed at introducing multiple diseases resistances into NABE 12C, a sugar climbing commercial bean variety highly preferred in Uganda, but susceptible to *Pythium* root rot disease, and NABE 14 a commercially

Pods of a plant of the BC4F5 generation derived from intercrosses of NABE 12C and the disease resistant varieties G2333 (ANT resistant), RWR 719 (Pythium resistant), and Mex 54 (resistant to ALS), 2017.

important bush bean variety very susceptible to ANT. The target diseases were anthracnose (ANT), *Pythium* root rot and angular leaf spot (ALS). The bean varieties used as donors of disease resistance were G2333 (which carries the ANT resistance genes CO-5 and CO-42) RWR 719 (resistant to *Pythium*) and Mex 54 (ALS resistant). Crosses were first made between the three donor parents to generate a three-way male gamete, F1 [RWR 719 x (G2333 x Mexico 54)]. In the next cross, only F1 plants of the three-way male gamete positive for all the three markers, PYAA 19 (linked to *Pythium* resistance in RWR 719), SH18 and SAB3 (linked to the ANT resistance genes in G2333) were used for crossing to NABE12C. NABE14 was crossed to G2333 as a donor for ANT resistance, and BC3F1 populations were developed. The project optimised the use of molecular markers used to track the multiple resistance in the breeding populations. BC4F3s populations were developed and selected advanced breeding lines were selected for advanced yield trials (currently underway).

Seeds of NABE 12C (i), NABE 14 and of plants selected with markers associated with ANT resistance in the breeding programme (iii); Bean breeding populations in the greenhouse (iv).