

Abstract

# Heterobeltiosis in Banana and Genetic Gains through Crossbreeding <sup>†</sup>

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<sup>†</sup> Presented at the third International Tropical Agriculture Conference (TROPAG 2019), Brisbane, Australia, 11–13 November 2019.

Published: 8 April 2020

**Abstract:** Heterosis, or hybrid vigour, is the superiority of the hybrid for a certain trait over the mean of its two parents. Heterobeltiosis is a form of heterosis where the hybrid is superior to its best parent. Banana breeding is a tedious, time-consuming process, taking up to two decades to develop a hybrid. Understanding heterosis in banana breeding will contribute to selecting right breeding materials for further crossing, thus increasing banana breeding efficiency. Here we document heterobeltiosis by using the recently bred NARITA ‘Matooke’ hybrids and their ancestors. NARITA hybrids, their parents (4x and 2x), grandparents (3x and 2x), and local 3x ‘Matooke’ cultivar checks were planted in a rectangular lattice design with two replications. Yield and other agronomic data were collected at flowering and harvest. The NARITAs were compared with their 3x ‘Matooke’ grandmothers. Heterobeltiosis on bunch weight was calculated with the data of 3 cycles. All the NARITAs showed heterobeltiosis for bunch weight. NARITA 17 had the highest grandparent heterobeltiosis (ca. 250%). Genetic gains due to crossbreeding were determined for fruit yield considering three generations: matooke cultigen (C<sub>0</sub>), primary tetraploid hybrids (C<sub>1</sub>) and secondary tetraploid hybrids (C<sub>2</sub>). The average genetic gain (from C<sub>0</sub> to C<sub>2</sub>) rates for bunch weight (kg) and yield potential (t ha<sup>-1</sup> year<sup>-1</sup>) were 1.4% and 1.3% per year, respectively.

**Keywords:** East Africa; fruit; heterosis; matooke; *Musa*; NARITA; selection cycles; yield potential



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