

## ‘MSHINDI’ KABLANKETI DRY BEAN FOR EAST AFRICA

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Dry beans provide a significant source of protein and calories to the majority of Tanzanians. Yields are often below 500 kg ha<sup>-1</sup> whereas yield potential with agricultural inputs can be up to 2,500 kg ha<sup>-1</sup>. Yields remain low in part because of biotic and abiotic stresses (Wortmann et al., 1998). The Bean/Cowpea CRSP supported varietal development at Sokoine University of Agriculture (SUA) in Tanzania from 1981 to 2007. The program focused on yield stability, adaptation to low to mid altitude (<1000 masl) environments and disease resistance.

Kablanketi is an important bean market class in southern and central Tanzania. The original ‘Kablanketi’ landrace had seed with fine purple flecking superimposed over a cream background, and a type III indeterminate growth habit. Kablanketi was probably first introduced from Zambia into the southern Tanzania highlands about three decades ago (C. Madata, Uyole Research Station, personal communication). Its diffusion throughout Tanzania was very rapid compared to formal bean variety introductions because of its highly desired consumer qualities.

**Origin:** Mshindi was derived from the cross ‘Rojo’ x Kablanketi made in 1992-93. Rojo is a large red-seeded variety released by SUA in 1997 with *I bc-1*<sup>2</sup> BCMV/BCMN resistance, race specific angular leafspot resistance, and moderate common bacterial blight and halo blight resistance. Rojo was derived from ‘SUA 90’ x 86EP5034-B, the latter of which has the pedigree [(Blue Mountain x NY76) x (Cornell49-242 x Montcalm)]. SUA 90 was developed at CIAT (accession number G5476; Hillocks et al., 2006) and distributed in Africa with the designation TMO 216. Blue Mountain is a snap bean released in 1983 (Silbernagel and Drake, 1983). ‘Montcalm’ is a dark red kidney bean released in 1974 by Michigan State University. Cornell 49-242 is a small black from Venezuela, and the origin of NY 76 is unknown.

The Rojo x Kablanketi cross was advanced through the F<sub>1</sub> and F<sub>2</sub> generations in 1993. In 1994, farmers evaluated seed and plant characters of about 1,000 F<sub>3</sub> progeny rows at the SUA Mifiga research farm (Michael Butler et al., 1995). The F<sub>4</sub> generation was advanced without farmer participation. In the F<sub>5</sub>, 60 single plant derived progeny rows were again evaluated by farmers. Selected F<sub>6</sub> lines were placed in preliminary trials and 16 F<sub>7</sub> lines were evaluated in advanced trials. Eight F<sub>8</sub> lines were evaluated, and on-farm trials were initiated in 2001 and 2002. Advanced and on farm trials were repeated in 2005. Mshindi was also tested in 2005 by the National Bean Program at the Selian Research Center in Arusha. On-farm trials were conducted in Msongozi and Maharaka Village in Morogoro rural district in 2001, 2002, 2005, and Dihinda Village in 2002, 2004, 2005 in Mvomero rural district.

**Description:** Mshindi, previously tested as EG 21, means “Winner” in Swahili. Mshindi out-yielded the local check (‘Kenya’) in 10 of 12 trials and had an overall yield advantage of 117%. Similarly, Mshindi out-yielded SUA 90 by 107% with higher yields in 67% of the trials. When compared to Rojo, Mshindi yielded 98% of the check and had higher yields in 53% of trials. Yields for Mshindi ranged from 975 – 1783 kg ha<sup>-1</sup> at the Mafiga and Selian sites and from 363 – 1665 kg ha<sup>-1</sup> in farmer’s fields at Msongozi, Maharaka and Dihinda. Kablanketi was not included in the bush trials,

but in climbing trials conducted at SUA in 1999-2000, 2005-2006, yields ranged from 376 - 1495 kg ha<sup>-1</sup>.

Mshindi averages 33 d to 50% flower, and 77 d to 85% buckskin pods. It was similar to 'Kenya', 'SUA 90' and 'Rojo' with days to 50% flower of 34, 33, and 32, and days to maturity of 77, 78, and 77 days, respectively. 'Kablanketi' matured in 70 d in SUA trials.

Mshindi has erect determinate bush (Type I) growth habit averaging 49 cm in height. Flowers are pink but other plant parts lack anthocyanin.

Seed of Mshindi was 28.9 g·100 seeds<sup>-1</sup> averaged over 12 trials. Kablanketi, SUA 90, Rojo, and Kenya averaged 27.5, 26.9, 38.9, and 36.4 g·100 seeds<sup>-1</sup>, respectively. Mshindi seed is dull with a pink background overlain by a fine purple flecking. Mshindi seed differs from Kablanketi in its pink rather than cream background. This novel color combination was identified by farmers as being potentially desirable because it combined the colors of two preferred market classes (Michael Butler et al., 1995).

BCMV/BCMNV symptoms were never observed on Mshindi in field trials. Mshindi was evaluated in 15 trials for reaction to ALS, 12 trials to CBB, and three trials to bean rust. Based on trials with moderate disease pressure, we classify Mshindi as moderately susceptible to ALS, and resistant – moderately susceptible to CBB. The three check varieties were moderately susceptible to CBB and ALS. Rust infection was too light to determine resistance reaction.

Mshindi cooks in 29 min as determined by Mattson cooker (Mattson, 1946) over gas and 112 min over charcoal (aver. two villages). SUA 90, Rojo and Kablanketi had similar cooking times while Kenya cooked in 23 min. Kenya had a shorter cooking time (98 min) over charcoal whereas Rojo and SUA 90 were longer (130 and 120 min, respectively).

Seventy-two farmers from Maharaka and Msongozi villages evaluated Mshindi and checks for dry seed color, cooking time, broth and soup suitability, and taste. Fifty-two farmers also evaluated marketability. More than half found the color to be suitable or highly suitable, similar to SUA 90 and lower than Rojo and Kenya. Two-thirds thought that Mshindi was highly suitable or suitable for cooking time, taste and marketability. Sixty-one percent of farmers found the taste to be suitable or highly suitable.

Mshindi was approved for release by the Tanzania National Variety Release Committee with no restrictions on propagation and use. Small quantities of seed for research purposes are available from the bean breeding program at SUA.

## REFERENCES

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