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MAIZE LANDRACES OF SIKKIM



NICRA
National Initiative on Climate Resilient Agriculture



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Murali Makkai

adaptation to the local environmental conditions and also for quality, prolificacy, disease resistance and yield.

Maize landraces

The landraces are named mainly on the basis of ear characteristics or the colour of the ear. Landraces of maize found in Sikkim are Murali Makkai, Seti Makkai, Pahlenlo Makkai, Rato Makkai, Baiguney Makkai, Lachung Makkai, Sherung, Tempo Rinzing, Garbarey, Khukurey, Kalo Makkai, Putali Makkai, Chaptey Makkai, Kuchungtakmar Makkai, Bancharey Makkai, Kuchungdari and Gadbade Makkai.

Sikkim is known worldwide for its typical maize called Sikkim primitive or locally as Murali Makkai. It has a unique characteristic of prolificacy or multiple cob bearing. Two forms exist one is purple coloured i.e Sikkim Primitive-1 and other is yellow coloured that is Sikkim Primitive-2. The essential characters are 5-6 cobs/plant, small cob size and high popping efficiency. The stover also remains green after maturity and thus serves as fodder crop. Pahlenlo Makkai (yellow coloured) and Seti (white coloured) Makkai are the most widely grown maize landraces. These are characterized by tall stature, good cob size, susceptible to lodging and 130-140 days duration. Their usefulness is in their thick husk cover and oblong cob orientation which impart resistance against ear rot in rainy season. Lachung Makkai bears multicoloured cobs and is cold tolerant. Tempo Rinzing is an early maturing landrace maturing in 85-90 days in hills. Putali Makki exhibits beautiful pinkish markings on grains, Baiguney Makkai has dark purple coloured cobs, Rato Makkai has attractive red coloured grains, Bancharey Makkai, a high altitude maize with flint kernels, Kukharey Makkai with short stature plants, Kuchungtakmar with mix of yellow, white, purple and red kernels.



Baiguney Makkai

Maize landraces in climate change era

There are both threats and potential of maize landraces of Sikkim under climate change. Early maturity is a character which can escape drought and heat stress period. The unique characteristics like early maturity can be used for development of early maturing maize varieties to escape stress conditions. The multiprolificacy can be exploited for the development of multicob bearing hybrids for high yield under stress environments. Cob rotting is a common problem in areas receiving high rainfall thereby landraces like Pahlenlo and Seti Makkai having thick husk cover can be improved for high yield and short duration and can be used for developing hybrids especially for areas having high rainfall. Cold



tolerance can be introgressed in elite inbreds or populations for development of hybrids or composites for hilly areas and also for exploiting maize production in Rabi season in hilly areas. Some of the landraces like Murali Makkai performs poor under water stress conditions, thereby drought for these landraces can be a threat. Temperature rise in high hill areas can affect the adaptability of the landraces like Lachung Makkai and Tempo Rinzing which are adapted to low temperature in high hill areas. Water stress affects the phenology and the duration of the crop due to their non-adaptability to stress conditions. Recent research trials on drought and cold stress tolerance showed the prolonged maturity duration and poor vegetative growth in most of the landraces.



Murali Makkai

Future thrust

Improvement of local landraces is important to utilize the unique characters in them and correcting the limiting traits. Conservation is equally important as these landraces are prone to extinction due to the increasing area under hybrids and improved composites which are depleting the area under local maize cultivars. These farmers' landraces needs to be conserved under PPV&FRA and in long term storage facilities like NBPGR after proper documentation. The local maize germplasm having stress tolerant traits needs to be registered so that these resources can be used under the purview of benefit sharing by other researchers. Farmers should be encouraged to save seeds of these germplasm by allocating some funds for conservation of these genetic resources. The strategies like *in-situ* and *ex-situ* conservation need to be strengthened in order to conserve these invaluable genetic resources.