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Conservation of Banana Diversity in Bay Islands–An Approach to Prevent Genetic Erosion

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Banana is one of the oldest fruits known to mankind. South-East Asia is considered the as place of origin for *Musa acuminata* and *Musa balbisiana*, which are the ancestral species of banana. The Andaman and Nicobar group of Islands which are situated 1200 km away from mainland of India in the Bay of Bengal forms an arched string of about 572 islands and isles, stretching from Burma in the North to Sumatra in the south between 6° and 14° N latitudes and 92° and 94° E longitudes. The total land area of these islands amounts to only about 8249 sq km of which about 86% is covered by lush green tropical rain forests. The islands receive an average rainfall of 3100 mm distributed over 8 months. The location of these islands suggests that the Andaman group of islands may have cultivars of Burma origin and Nicobar group of islands may have cultivars of Indonesian origin. The unexploited fragile ecosystem offers lot of scope for banana diversity. Currently banana production in the globe is threatened by biotic pressures, which have increased in the past two decades. Pathogenic form of fungal diseases like Sigatoka leaf spot and *Fusarium* wilt have spread to all banana growing states in our country. Banana streak virus infects Poovan, a leading commercial cultivar, grown all over the country. Hill banana, which are famous in Tamil Nadu, are in the danger of extinction due to banana bunchy top virus. *M. acuminata* sub sp. *burmannica*, which is considered one of the resistant sources for nematode breeding is on the brink of extinction. Thus, conservation of banana germplasm by any means has to be taken in an intensive manner. At present Bay Islands have recorded nearly 20 cultivated types and six wild types of banana.

An exploration tour was undertaken in North and South Andaman. Places of collection were divided into two types (i) primary sources like forest areas and (ii) secondary centres like farmers and markets *etc.* The selected plants were characterized morphologically and genetically using Simmonds and Sheperds (1952) scoring technique and IPGRI descriptors. Conservation of the collected germplasm was carried out in field gene banks, *in situ* and village seed banks.

Since the Island consists of people drawn from all the states of India, the flora has been subjected to long period of natural and human introduction and selection. Wild banana dominates the forest flora in certain pockets. The highly endangered wild types like *M. acuminata* var. *andamanica; M. acuminata* sub. sp. *burmannica., M. acuminata* sub. sp. *malacansis* were collected, characterized and conserved. Clearing of the natural vegetation for settlements and agriculture has almost wiped out the forest trees and natural variability available in the forests. The conservation of banana germplasm along with endangered medicinal plants has been impeded due to lack of awareness about its availability, distribution, reproduction biology and breeding systems. To prevent further erosion of these population both *in situ* and *ex*

situ methods of conservation is the need of the hour.

In situ conservation is the best for richer specific endemic species, through identification and demarcation of areas of representative populations as "preservation plots". The diversity of banana in the Andaman is being mapped for both wild and cultivated types. Due to the proximity of Andaman Islands to Burma, ecotypes of Burma origin are found in the forests of South Andaman. One such type is *M. acuminata* var. *burmannica* (Ac. No. 30106). This type is being maintained under *in situ* condition with constant monitoring and evaluation. Due to constraints such as local encroachment, maintenance of germplasm under *in situ* conditions is under threat. The next alternative for conservation is through field gene bank.

Gene banks are the reservoirs of genetic variability as they provide desirable traits for the breeders to develop superior genotypes. CARI has developed a field gene bank for banana consisting of 20 cultivated types and 4 wild types. All the varieties in the gene bank are collected from the island alone (Table 1).

The important functions of gene banks are:

i. To assemble the genetic resources of the banana from all over the Andaman and Nicobar Islands.
ii. To propagate and conserve the collected genetic resources under proper cultural and phytosanitary conditions.
iii. To carry out preliminary evaluation for the genetic resources by recording important qualitative and quantitative traits.
iv. To maintain liaison with NBPGR and NRC (Banana) for technical expertise and documentation.

The concept of village gene banks wherein the concerned farmers' fields are used as gene banks. The village gene bank are being maintained by farmers in their fields.

With the currently debated issues of IPR, benefit sharing, biosafety, documentation and conservation of the existing banana diversity is of great importance. Due to the isolated nature of these islands from the mainland dreadful diseases like banana bunchy top, bract mosaic virus are totally absent. This factor along with optimum environment for banana growing suggests that these islands can be effectively used in conserving the banana germplasm that is threatened in other parts of the country.

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Table 1. Germplasms at field gene bank at CARI, Port Blair

Wild banana/clones	Synonyms	Genomic group
Katta champa (1)	Poovan, Mysore, Palayankodan, Champa	AAB
Katta champa (2)	Pisang kempu	AAB
Meeta champa (1)	Sugandhi	AAB
Meeta champa (2)	Thalla chakkarakeli	AAA
Lal kela	Red banana, Chenkadali	AAA
Rathalu	Venkadali, Gren red	AAA
Raja Bale	Raja vazhai	AAA
Dwarf Cavendish	Basrai, Jahaji, Vamanakeli	AAA
Nendran	Rajeli	AAB
Korangi	Pisang kelat	AAB
Cheena kela (1)	Karpooravalli	ABB
Cheena kela (2)	Kanthali	ABB
Monthan (1)	Bluggoe	ABB
Monthan (2)	Sambarani Monthan	ABB
M.balbisiana var.*andamanica*	–	ABB
M.balbisiana var. from *Nicobar*	–	ABB
M.acuminata sub sp. *burmannica*	–	AA
M.acuminata sub sp. *malacansis*	–	AA
Ney Poovan	–	AB