

SURVEY AND COLLECTION OF MULTICROP DIVERSITY FROM PARTS OF UPPER ASSAM AND LOHIT, DIBANG VALLEY OF ARUNACHAL PRADESH

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ABSTRACT

Three hundred twenty seven accessions belongs to different crops were collected from Sonitpur, North Lakhimpur, Dhemaji, Dibrugarh, Tinsukia districts of Upper Assam and Chowkham, Wakro, Tezu, Hayuliang, Walong of Lohit district & Roing, Myodia Pass of Dibang valley district of Dibang valley district of Arunachal Pradesh. The collected material of rice, maize, grain legumes, chillies, cucurbits and banana showed a wide range of variability. The variability in rice from Upper Assam was observed to a great extent in respect to their plant height, number of tillers, panicle length, awn length and colour, glume colour, grain size and shape, grain weight, grain thickness, aroma as well as the maturity time. Local ethno botanical uses were also recorded in course of this survey

INTRODUCTION

North Eastern India is a meeting ground of the Indo-Malayan and Indo-Chinese bio-geographical realms (Rodgers, 1985), covering the biotic province of Brahmaputra valley and Assam hills where many Himalayan and peninsular Indian elements are available. Due to tough terrain and hostile climatic conditions some parts of Upper Assam and Lohit and Dibang Valley districts of Arunachal Pradesh remain cut off from rest of the country almost six months in a year. So, an exploration tour was undertaken in collaboration with NRC, Orchids, Pakyong, Sikkim to tap the various crop germplasm diversities that are occurring in this area. The trip was executed in between 03.06.2001 to 24.06.2001 and the route followed during the exploration is shown in Fig. 1. Three hundred twenty seven samples were collected during this exploration trip (Table 1). The break-up of collections is cereal (68) and pseudocereal (18), vegetables (40), grain legumes (18), oil seed crops (9), fruit crops (16), spices (35), Orchids and ornamental plants (106), medicinal plants (4), fiber crops (2) and miscellaneous (11). A total distance of 3460 Km was covered during the trip. Few areas of Upper Assam and Lohit and Dibang valley are the remotest areas of the respective state. Upper Assam area is very rich in rice, cucurbits, banana, orchids and medicinal plants. Whereas, Lohit and Dibang valley districts of Arunachal Pradesh represents the plain and high hill regions and inhabited by Miri-Mishimi, Digaru-Mishimi, Idu-Mishimi, Khamti tribes mainly. Lohit and Dibang valley are very rich in diverse plant genetic resources due to its remoteness, climate and topography. High altitude regions of Lohit and Dibang valley districts, particularly Walong, Kibitho and Myodia circles are backward in agriculture. However, Kibitho area of Lohit and Myodia of Dibang valley district are very rich in natural flora and medicinal plants. Myodia and Hayuliang circle are very rich in orchid species, while the climatic condition and vegetation of both the locations are quite different. In Upper Assam and plain areas of Lohit and Dibang valley districts, three type of paddy crop (i.e. *Sali*, *Boro* and *Ahu*) are grown by the farmers corresponding to the season. The flood prone areas are usually utilized by cultivation of '*Bao*' (deep water) paddy.

SURVEY AND COLLECTION

Physiographically, the surveyed area characterizes from plains, hills to the high mountainous areas with temperate, subtropical and mild tropical climate depending on the altitude and this ranges from 50m to 2655m above msl. Most of the cultivated lands in these areas are rainfed and some areas are flood prone. Germplasm samples were collected from natural wild habitat, threshing yard and farm stores. Sampling strategy was followed by random, bulk and selective methods as per the suitability. Each germplasm samples were given a collection number and the corresponding passport information was recorded.

A total of 327 samples belongs to different crop were collected from variablesampling sites (Table 1). Out of these collections, 53 important landraces of lowland, deep waterand upland paddy were collected from Pabhoi, Chandmari (Sonitpur); Rajbari, Jorhat, Gourmukh, Siabari (North Lakhimpur); Gugula (Dhemaji) Govindpur, Sangali Jango (Tinsukia); Wakro, Chowkham, 32 mile, Khopa (Lohit) and Roing (Dibang). Ecologically, most of them are grown in submergence water of lowland condition. These landraces of rice are very interesting viz. Kunkuni (scented), Rangbalam (putting type), Komal dhan (used raw after soaking in water), Bora (used for light breakfast, and making traditional cakes), collected from Pabhoi (Sonitpur). The landraces *Soru Zhangia* (late growing), Nira Kadam (used for Chura preparation) were collected from Garu muck, North Lakhimpur. Once rice genotype Naga Sali was collected which gives a yield 40-50 Q/ha. Local rice genotypes such as Mainbow (Lambin, Wakro) and Peong (Khare, Wakro) are specially used for making 'Apong' (Local rice bear) by local tribal people. Two more landraces office i.e. Deodhan (late type) and Mutandhan (early maturing) were collected from 19 mile area of Tezu (Dibang valley). In maize, maximum material were collected from Arunachal Pradesh. The collected 15 samples showed a good variability in grain size, grain colour, cob size/length, number of cobs per plant and grain weight. Wide variability was observed for spices and vegetable crops particularly in chillies (11) and cucurbits (19). In chillies variability was recorded forfruit size, number of fruits per plant, plant height and pungency. In 32-mile forest area of Tezu division of Lohit valley district of Arunachal Pradesh, a landrace of chilli with very small fruit and high pungency is found growing natural wild condition. Variability among cucurbits (bottle gourd, pumpkin & ash gourd) was observed in terms of fruit size, shape, weight and number of fruits per plant. A wide range of variability was collected in ginger and turmeric especially from Lohit district. A landrace 'Aam Ada' (possessing mango flavour) was collected from the valley and a rich diversity also collected in turmeric.

Out of 5 banana landraces, the collected material showed variability in respect of plant height, fruit size, number of fruits per plant, number of vegetable type from Sri Pani Deuri village of Dhemaji district Assam. A local variety named 'Bogie' collected from Jaipur village of Lohit district of Arunachal Pradesh. 'Mishimi Kola' was collected from Mipu Basti of Tezu circle of Arunachal Pradesh and wild genotype with light red coloured pseudostem was collected from the Tafara village of Tezu circle. During the trip of Lohit and Dibang valley, five different type of wild seeded banana, with very small fruit were also collected. Medicinal plants viz. *Copits teeta*, *Rheum spp.*, *Zanthoxylum sp.*, *Tupistra sp.*, and another two plants were collected from Lohit and Dibang valley districts. Three different types of soybean were collected i.e. white, black and brown seeded. In rice bean, two types: chota mishimi (dal) and mota mishimi dal were collected from the tribes of Lohit and Dibang valley. Mishimi tribes takes this rice bean dal along with rice. Variability in cowpea and French were observed in Upper Assam and Lohit and Dibang Valley. Among oil seeds, rye and *Brassica campestris* are mainly grown for leafy vegetable purposes. While, yellow sarson (*B. Juncea*) is grown for seed purposes. White and black coloured sesame was used by the tribal peoples in religious ceremony as well as a medicine during delivery time.

A total of 100 genotypes were collected from Hayuliang, Myodia Pass, Wakro and Tezu of Arunachal Pradesh and Dhemaji North Lakhimpur and Sonitpur areas of Upper Assam. Some of the important orchid genera are; *Oberonia*, *Aerides*, *Eria*, *Coelogyne*, *Arachnanthe*, *Pholidota* and *Rhynchostylis* from Sonitpur (Assam); *Epigeneium*, *Acampe*, from Chowkham; *Arundina* and *Anthogontum* from Lambin (Wakro), *Vanda carinata* and *Smitinandia* from Hayuliang. Two interesting genera i.e. *Calanthe* and *Pletone* from Myodia Pass.

Table 1. Cropwise list of collected crop germplasm

Sl. No.	Crop Group	Crop (S)	Total Accessions
1.	Cereal	Paddy (53), Maize (15)	68
2.	Pseudocereal	Chenopod (2), Buckwheat (4), Foxtail millet (4), Kodo millet (4), Amaranth (4)	18
3.	Grain legumes	Cow pea (5), Pigeon pea(1), Lenti (1), Vigna sp.(1), Rice bean (2), Soybean (4), Sem bean (1), French bean (1), Urd bean (1), Pea (1).	18
4.	Vegetable	Pumpkin (6), Tomato (2), Ridge ground (3), Bitter gourd (4), Ladies finger (2), Cucumber (2), Pointed gourd (1), Spiny gourd (1), Brinjal (3), Bottle gourd (5), Polygonum (1), Leafy brassicae (3), Sweet potato (2), Smooth gourd (1), Water melon (1), Ash gourd (1), Radish (2).	40
5.	Oil Seeds	Linum (1), Niger (1), Sesame (3), Perilla (2), Brassica (2).	9
6.	Spices	Chilli (11), Turmeric (8), Black pepper (2), Onion (1), Ginger (9), Garlic (2), Coriander (1), Long pepper(1).	35
7.	Fruits	Mango (5), Passion fruit(1), Papaya (1), Banana (5), Baccaurea (1), Jamun (1), Jack fruit (1), Lemon (1)	16
8.	Ornamental	Orchids & other bulbous plant (105), Ornamentalflower (1)	106
9.	Medicinal Plants	Coptis (1), Rheum (1), Tupistra (1), Zanthoxylum (1)	4
10.	Fiber crops	Sunhemp (1), Jute (1)	2
11.	Miscellaneous	Unidentified (3), Canna spp. (1), Sugarcane (2), Opium (2), Tobacco (1), Jatropha (1), Member of Acanthaceae family (1)	11
Total =			327

Table 2. Collecting site of rice genotypes and their characteristics

State/District/Place Altitude (amsl)	Landrace	Ecology	Characteristics	Sowing time	Harvest time
A. Assam					
1. Pabhoi (sonitpur) (60-70)m	Dhisaro	Lowland rice	Long & yellow grain, plant ht. 2.5-3, yield 28-30 q/ha	June-Aug	Sept
	Bogi Sali	Lowland rice	Bold yellow & long grain	June-Aug	Sept
	Kola Joha	Lowland rice	Scented, long black grain, good taste	June-Aug	Sept
	Suhag Moni	Lowland rice	Medium, brown grain, both ends of grain yellowish coloured, good quality	June-Aug	Sept
	Rangabalam	Lowland rice	Puffing rice, height brown grain colour, tall type	June-Aug	Sept
	Kun Kumi	Lowland rice	Highly scented, very soft grain, tall type, small & thick grain, fine quality	June-Aug	Sept
	Pani Maguri	Lowland rice	Fine & medium grain, tall type	June-Aug	Sept
	Mahsuri	Lowland rice	Tall, medium & fine quality grain	June-Aug	Sept
	Kornaldhan	Lowland rice	Bold yellowish grain, no need to boil, taken just after soaking with water, tall type	June-Aug	Sept
	Saral Joha	Lowland rice	Tall type, medium sized yellowish grain, good quality	June-Aug	Sept
	Agni Sali	Lowland rice	Coarse rice, medium sized grain, brown & bold grain	June-Aug	Sept
	Bora	Lowland rice	Sticky grain, taken as light breakfast, tall type, bold and brownish to blackish grain	June-Aug	Sept
	Prasad Bhog	Lowland rice	Requires frequent irrigation, very tall type, medium sized grain with brown colour, fine quality	June-Aug	Sept
	Maguri	Lowland rice	Medium yellowish grain, all type	June-Aug	Sept
2. Chandamani (Sonitpur) (95 - 100 m)	Aizong	Lowland rice	Plant height 3-4, light brown medium size grain, fine quality & taste	June-Aug	Sept
	Naga Sali	Lowland rice	Very tall type, medium sized brownish grain, high yielder, 35-40 q/ha, fine cooking quality	June-Aug	Sept
	Komal dhan	Lowland rice	Ridged glumes, light brownish grain	June-Aug	Sept
	Manohar Sali	Lowland rice	Bold sized & yellowish grain colour	June-Aug	Sept
	Bor dhan	Lowland rice	Medium & brown to blackish grain colour, 3-4' plant	June-Aug	Sept

3. Rajabari (North Lakhimpur) (95-100m)	Bormugi Anam Pakhi	Lowland rice Lowland rice	height, pubescent grain 3-4' tall, good taste sized & yellow coloured grain, good cooking quality Long yellow grain tall type	June-Aug June-Aug June-Aug	Sept Sept Sept
4. Jorbari (North Lakhimpur) (94 - 100m)	Nolsutee Jahinga Gudimoni Bora	Lowland rice Lowland rice Lowland rice Lowland rice	Small bold yellowish to light brown grains Long, light brownish coloured and fine grain, good taste Tall type, medium sized brown grain Small sized, yellowish grain colour, ridges on glumes, tall type	June-Aug June-Aug June-Aug	Sept Sept Sept
5. Gourmukh (North Lakhimpur) (95 - 100m)	Gudimoni Bora Gudimoni Bora Soru Zhangia	Lowland rice Lowland rice Lowland rice Lowland rice Lowland rice	Brown to blackish grain, long & fine grain, tall type Coarse rice, small grain, grown awn colour, tall type Very sticky rice, scented, tall type, used to make local type of cake Reddish coloured kernel, scented used for making local type of cake Tall & late type, fine quality, small & yellowish grain, fine quality rice	June-Aug June-Aug June-Aug	Sept Sept Sept