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RICE GERMPLASM COLLECTION IN TRIPURA STATE

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Tripura in the North-eastern region of India is a very rich resource of rice germplasm diversity. The landraces adapted to upland (tillas) and lowland valley areas responsive to low potash and phosphorus, and less prone to floods and various insect-pests diseases, are of immense value in country's rice improvement programmes. Keeping this in view, extensive collection programme was undertaken in all the areas of Tripura state to ascertain the present status of rice landraces of Tripura; to find out gaps in germplasm collection and to indicate if any genetic erosion has occurred. Wide variation in the upland and wet land rice landraces in Tripura was found. However, due to modernisation of agriculture especially in the valley areas and adjoining hills (tillas), many of the landraces of rice have already disappeared. The rate of loss in the past 15-20 years period varied from 12.5 to 73.3 per cent. In the hills dominated by tribals, some indigenous types are still in cultivation. This may be due to poor transport and other communication links and the low interaction of the extension agencies. There is still ample scope for the collection of rice germplasm tolerant to moisture stress, responsiveness to low phosphorus and potash soils from certain parts. Such potential areas are Jampui hills, North Tripura bordering Mizoram and parts of Chittagong hill tracts in the South Tripura districts.

Tripura is the smallest state in the north-eastern region of India. It is situated between 22°90' and 24°60' north latitude and 91.20° and 92°41' east longitude which comprising of long hill ranges alternating with valleys. Forests cover about 54.5 per cent of the total geographical area in the state. The crop cultivation is restricted to 23.9 per cent of the area only. The climate is mild tropical (temperature ranges 6°C to 37°C, average annual rainfall 2780 mm and mean relative humidity 79.9 %). The altitude ranges from below 0 to 900 m above sea level. The soils are generally medium in organic matter, deficient in available phosphorus and potassium. Rice is a major cereal crop. This study attempts to bring out a complete account of rice landraces available in Tripura state which had and those even existed earlier (and now no more available). The inhabitation of large number of tribes differing in their rice preferences, cultivated a large number of varieties. It was worthwhile to know these landraces. Since the state is surrounded by Bangladesh on three sides, a change in varietal pattern there is being reflected here due to the introduction from across the border

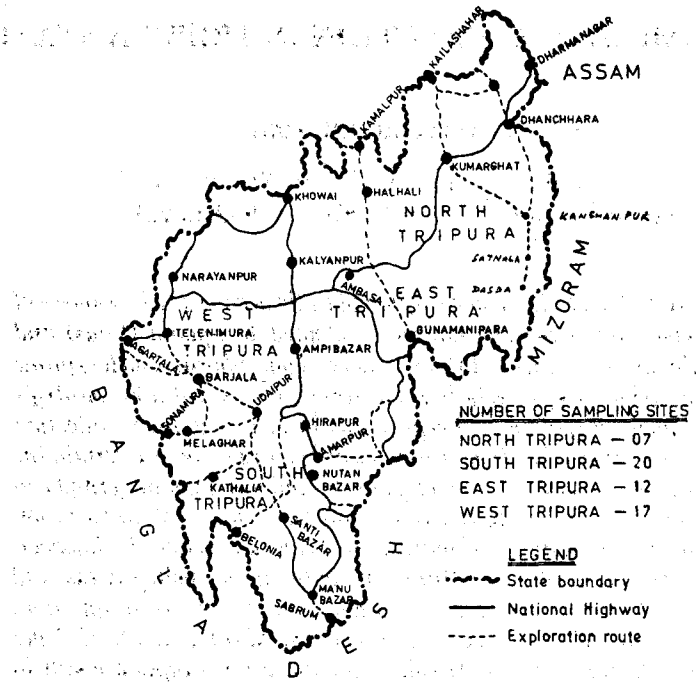

Fig. 1 Routes followed during collection of rice Germplasm in Tripura State in Tripura State in 1986, 1988 and 1990.

of all high yielding types mainly IRRI material or selections from it. These factors and opportunities to explore these areas were conducive to the work being reported herein.

MATERIAL AND METHODS

During three exploration trips in 1986, 1988 and 1990, the diverse agro-ecological areas were extensively surveyed. A total of 103 rice germplasm samples were collected (Table 1) from 56 sites located in East Tripura-12; West Tripura-17; North Tripura-7 and South Tripura-20 represented in Fig. 1.

Table 1. Summary of rice germplasm collected in Tripura State of N-E India upto 1990

Year of collection	Number of samples	Rate of loss (%)
Before 1975	105	12.5
1976-1978	92*	23.3
1986	42	65.0
1988	34	71.7
1990	32	73.3

* Collections by Tripura Centre of ICAR Research Complex for N-E Hills Region

RESULTS AND DISCUSSION

Tripura state comprises of three districts (North, West and South) and has a large number of tribes and subtribes which have peculiar preferences for rice varieties. These people inhabit *tillas* (hillocks) and practice *jhum* (shifting) cultivation. Main tribes are **Bhil, Bhutia, Chaimal, Chakma, Garo, Halam, Jaintia, Khasi and Kuki.** There are 22 subtribes such as **Balte, Belalhur, Chhalya, Fun, Hajango, Jangtei, Khareng, Khephong, Kuntei, Laifang, Lentei, Mizal, Namte, Paitu, Rangchan, Rangkhole, Thanglua, Lepcha, Lushai, Mog, Munda, Riang, Santhal, Tripura, Tripuri, Tippera, Uchai, Rupini, Mulsoom, Manipuri. Riang** tribe is considered to be the most primitive among others. The tribals practise *jhum* cultivation. Plain valleys or flat lands are occupied by Bengalis and Muslims displaced from Bangladesh. There are thus wide variations in likings and dislikings for rice varieties among the people of Tripura. So, the rich rice diversity in the state is partly due to varied preferences and partly due to agro-ecological diverse conditions. Moreover the geographical situation of Tripura is such that it has the benefit of interaction or exchange of genetic materials with the people of Bangladesh, Assam, Mizoram, Manipur, Meghalaya, through tribal affinities as well as with Myanmar through Mizo hills and Bangladesh (Chittagong hills). Owing to this reason, as many as 115 to 120 landraces were found to be in cultivation in Tripura state. However, out of these, only 103 landraces were available about 15 to 20 years back.

The landraces found in Tripura are broadly classified as wet land rices for plain valleys, deep water paddy for river beds, *Jhum* and upland types according to their habitat and soft rice for local preparations such as *petha, muree* (Parched rice), *Cheera* (Flaked rice), *Khoi* (Parched paddy); scented and fine grain types according to their uses. The grain of *jhum* varieties were generally broad or round type. Scented varieties usually have small slender grains.

These landraces of rice are categorised as per the habitat and quality wise, viz., –

Wetland rices : These need standing water for their cultivation. These are *Khalisatiya, Chanmouri, Rangoon Buh, Binni* (white), *Sonamukhi, Meli, Rangagellong, Sarendyama, Charui, Billrong, Dulakanrong, Gheegoj, Bandosal, Mantotoi, Nadirsail, Latasal, Chaplaish, Jhikot, Lalmoti, Kushari, Malhail, Bowelia, Garcha, Binny Rongmala, Katikalam, Motori, Basa, Koshari, Sengamuri, Chewomuri, Jhingot, Chamlai, Phultengri, Tilak Kachhari, Hailchinal, Chankunia, Lingachikon, Rongichawal, Gorchalati, Gorchasada, Chalmuni, Mulai, Pakla, Jhingar, Kalpaha, Nagarasail, Biron, Kartik-kalam, Mainasal, Binny* (red), *Gorasal, Maluti, Kalamkati, Chikansal, Maichaha, Seroy* (red), *Jotinidhan, Laichha, Murari, Beti, Maichicon, Phakang,* and *Maidani.*

Upland (Jhum) types : Posses drought resistance, adaptation to low phosphorus and potash soils. These are *Badia, Maisai-ningha, Marao, Maima, Gelong, Binny* (white), *Bhadoia, Lankapora, Kamranga, Lumuru, Kanaktara, Koprok, Maiasaw, Jhum-maloti, Saroidhan, Sonamukhi, Betti, Seroy, Kanchali,*

Garo-maloti, Tripura Chinar, Bhjrah, Bidi kaprov, Rang kaprov, Kala kaprov, Badiya, Salungens, Sereh, Sutu Bhadity and *Misini.*

Deep water types : These can tolerate continuous submerged and flood water conditions. These are *Aus dhan, Batisar, Paresdhan, Nalbajal* and *Marabajal.*

Soft rice types : These are used as quick foods and for preparation of peetha (sweet), local beer etc. The varieties are *Baljuri, Pipralaish, Bindi* and *Manoharsali.*

Scented types : *Govind bhog* (black), *Khasa Govind bhog* and *Koliajiri.*

GENETIC EROSION

In recent years, there has been considerable genetic erosion for landraces. The number of indigenous varieties in 1990 has been further reduced to 32 whereas during 1986, the number of indigenous varieties was 42. Between 1986 to 1990, the available land races were

Wet land types : *Kalpang, Mainasal, Maloti, Nagarsail, Biron, Kartik kolom, Bindi, Kamranga, Nadirsal, Kalamkathi, Chikansal, Seroy* (red), *Maichaha, Kushehri, Jotinidhan, Tripura chinar, Laichha, Murari, Maichikon, Phakang* and *Maidani*

Upland (Jhum) types : *Jhum Maolti, Seroy* (white), *Binny* (red), *Kanchali, Gorasal Beti* and *Garo Maluti*

Deep water types : *Paresdhan, Mohriwatlok* and *Ausdhan*

Soft rice types : *Manohar Sal, Binny* (white), *Baljuri* and *Gheegoz*

Scented types : These are high quality rice varieties and are the costly varieties. These are *Gobind bhog* (black), *Sada Khasa, Kola Khasa, Sada Gobindbhog* and *Kaliajiri.*

The primary reason for this genetic erosion is the modernisation of agricultural and consequent awareness among farmers for the cultivation of high yielding improved varieties (*viz., DR 92, IR 8, IR 20, Jaya, Masuri, JR 9, JR 11, Jalaj, Kalinga-2, Basudev, Shyamali, Sona, Sonali, Ratna, Rasi, Bala* etc.), some of which even have come from Bangladesh and are the improved lines from the material received from the International Rice Research Institute, Manila, Philippines (e.g., *JR 11*). The result was the replacement of over 73 per cent of indigenous rice germplasm diversity.

Efforts to study change in rice diversity scenario over the past 15-20 years were rewarding in order to know the extent of genetic erosion (Table 1). The rate of loss of landraces varied from 12.5 per cent to over 73 per cent in 1990. This alarming loss of local germplasm warrants vigorous action for collection to avoid occurrence of a parallel situation in other north-eastern states.

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