

## COLLECTION OF RICE GERMPLASM FROM MALABAR, KERALA

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In an exploration undertaken in northern districts of Kerala, parts of South Canara and Coorg districts of Karnataka, 104 accessions of rice comprising 60 landraces and 24 wild rice samples falling under four species were collected. Some of the very rare landraces which are at the verge of extinction, such as 'Kurichyar', 'Karimpalar', 'Mavilan', 'Jathikurichyar', 'Wynadan chetty', 'Gounder' and 'Naikkar' could be collected. The collection included special purpose local landraces as detailed in the text.

**Key words :** Rice, wild rice, landraces, germplasm

Malabar is considered as one of the centres of diversity of rice and the antiquity of rice cultivation here dates back to 3000 B.C. (Manilal, 1990). The world renowned 'Pattambi' rice varieties which have contributed sources of resistance to many IRRI varieties are all pureline selections of landraces hailing from the erstwhile Malabar Province (Sukumara Dev, *et al.*, 1993). Diversity at ecosystem level, interspecific levels in addition to ethnic diversity is highest in this small stretch of land. Attempts have been made in the past to explore the region and 895 accessions of rice including 184 landraces and 213 accessions of wild rices were collected (NBPGR 1986-89; Vaughan & Muralidharan, 1988). To fill in the gaps in landraces collection the present programme was executed.

### MATERIALS AND METHODS

Coastal and midlands of Thrissur, Palakkad, Malappuram, Kozhikkode, Kannur, Kasaragod, hill district of Wynad and adjoining areas of Coorg and South Canara of Karnataka were explored (Fig. 1). In a 12 day collection programme in December 1996, 104 accessions were collected from 62 sites. Random samples in the case of wild rice and biased samples in the case of landraces were collected (Chang, 1976; Chang *et al.*, 1972). In addition to passport data, ethnobotanical notes on special uses of landraces were recorded. A part of the seed samples were sent to the medium term storage of NBPGR,



New Delhi and a small part was raised in pots during December 1996-April 1997 for characterization purpose.

## RESULTS AND DISCUSSION

Rice is grown throughout the region from coastal lowlands below sea level to 1500 m above MSL in Wynad. The mode of cultivation followed is diverse. The 'Punam valal', - a cut and slash type of cultivation in forest clearings (now practiced in rubber plantations in the juvenile stage), 'Modan' or upland rainfed, 'Oruppu'- of one crop in a year in terraced hills, 'Iruppu' - of two crops per year in planes, 'Pokkali' of saline coast lands, 'Puncha' of shallow waterbodies and 'Kayal' lands and 'Koottumundakan' or mixing of 'Virippu' (Kharif) and 'Mundakan' (Rabi) cultivars together so as to get two harvests from one sowing are all practiced to a limited extent, though irrigated transplanted rice is the main rice ecosystem.

Characteristics of important landraces collected are given in Table 1. Field observations and chracterization revealed wide variability for yield and yield contributing characters besides morphological traits. Plant height varied from 60-12 cm, number of tillers 5-18, days to maturity 90-130, panicle length 15-34 cm, number of primary branches 5-13 and number of grains per panicle from 36-230. Majority of the cultivars have red bold grains used for parboiling, though medium bold and short round were also present. Farmers reported between 6-23 q/ha yield for these landraces. All land races showed fertility except 5 lines as IC 203807, IC 2038081, IC 203808, IC 203811 and IC 203812. Only given lines showed white seed coat colours all others were red.

Landraces are still popular for their palatability and reliable yield performance even under low input conditions. Wynad and Coorg districts are still dominated by few traditional landraces like 'Marathondi', 'Thonnuran', 'Veliyan', 'Keduveliyan', ('Keerubeliya') and scented rices like 'Gandhakasala', 'Jeerakasala', 'Mullanchanna' and 'Rajani'. The cultivar 'Mullanchanna', in addition to scented quality, is preferred for "uppuma" and rice flour preparations. In other districts, 'Kaima' is the most popular red bold rice of irrigated transplanted belt. It fetches a premium price as it is used by rice mill owners to impart a better look to the lot by mixing 30% of this to other improved varieties.

Cultivation of medicinal rice 'Navara' has become commercial in some parts of Malappuram district where three crops per year are taken as irrigated transplanted rice whereas traditionally it is grown as rainfed upland rice by 'Kurichya' tribe in Kannavam forest. This high value crop, in addition to being an important ingredient of 'navarakkizhi' ('Panchakarma') in Ayurvedic treatment, is being used as weaning food. 'Chennellu', another landrace of

Table 1. Characteristics of important landraces collected

Sl. No.	IC No.	Landrace name	District & State	Plant height (cm)	Panicle length (cm)	Grains per panicle	Grain size	Husk colour	Remarks
<b>A. IRRIGATED TRANSPLANTED FIRST SEASON CROP</b>									
1	203786	Varukkunna nellu	Kasaragod, Kerala	85	24	117	Short bold	Gold & or gold furrows	Excellent popping quality; also suitable for II & III crops; rare
2	203825	Aryan	Malappuram, Kerala	90	25	108	Long bold	Gold & or gold furrows	Best cooking quality as parboiled rice; frequent
3	203794	Sonabithu	South Canara, Karnataka	75	23	96	Long bold	Brown furrows	Good yielder under low input organic farming; common in South Canara
4	203817	Thonnuran thondi	Wynad, Kerala	90	26	103	Long bold	Straw	Stable yielder, excellent as parboiled rice; frequent
5	203785	Nagari	Kasaragod, Kerala	90	28	146	Long bold	Straw	Excellent yielder; frequent
6	203744	Kochuvithu	Malappuram, Kerala	63	22	128	Medium slender	Brown furrows	Good yielder, rare
7	203746	Padannavella	Malappuram, Kerala	68	23	172	Long bold	Straw	Good yielder, rare
8	203750	Thavalakkannan	Malappuram, Kerala	70	20	78	Long bold	Brown furrows	Good yielder, still popular
9	203755	Omanakuttan	Malappuram, Kerala	75	22	107	Long bold	Straw	Suitable for both transplanting and broadcasting
10	203757	Aryankali	Malappuram, Kerala	70	20	72	Long bold	Brown furrows	Rare

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**B. IRRIGATED TRANSPLANTED SECOND SEASON CROP**

1	203795	Kaulkaima	South-Canara, Karnataka	92	24	172	Medium slender	Straw	Excellent yielder; secondary branches many; attractive panicle; popular in South Canara
2	203790	Kaima	Kasaragod & Kannur, Kerala	76	25	148	Long bold	Straw	Good yielder; excellent parboiled rice; most popular landrace of north Kerala
3	203751	Ennapatta	Malappuram, Kerala	68	20	86	Long bold	Straw	Panicle just exerted; average yielder; rare
4	203782	Veluthamundodan	Malappuram, Kerala	86	23	120	Long bold	Straw	Good straw and grain yielder; rare
5	203789	Puncha	Kasaragod & Kannur, Kerala	78	23	96	Long bold	Straw	Good yielder; common landrace of Malabar
6	203791	Undakaima/Urunkaima	Kasaragod & Wynad, Kerala	90	22	109	Short bold	Straw	Round grains, good yielder; rare

**C. UPLAND RAINFED DIRECT SEEDED ('PUNAM' CULTIVARS)**

1	203793	Chennel	Kasaragod & Kannur, Kerala	108	28	194	Long bold	Straw	Excellent yielder as upland as well as irrigated transplanted rice; good straw yield also; landrace of "Naikkar" tribe; nearly extinct
2	203771	Karuthanavara	Kannur, Kerala	78	21	68	Long bold	Black	Compact panicle with few or no secondary branches; poor yielder; medicinal, high value crop
3	203821	Karakkozhivalan	Kasaragod, Kerala	86	25	108	Long bold	Straw	Primary branches terminate at the same level; good for parboiling and rice flour preparation
4	203779	Keeripallan	Kasaragod, Kerala	112	29	182	Long bold	Straw	Kernel tip black dotted, good for rice flour; rare

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5	203772	Vellakoyala/ Veluthon	Kannur, Kerala	112	27	178	Medium slender	Straw	Thick culm; good straw and grain yield; nearly extinct
6	203769	Palkaima	Kannur, Kerala	93	27	188	Long bold	Straw	Excellent cooking quality; nearly extinct
7	203792	Veluthadichal	Malappuram, Kerala	98	24	140	Long bold	Straw	Compact panicle; good straw yield; nearly extinct
8	203766	Ambaladan	Kannur, Kerala	120	28	188	Medium slender	Straw	Thick culm; good straw yield; open panicle; nearly extinct
9	203819	Chuvannachoman	Malappuram, Kerala	92	30	126	Long bold	Straw	Nearly extinct
10	203820	Karuthachoman	Malappuram, Kerala	92	21	63	Long bold	Black	Compact panicle; sterile glume slightly black; nearly extinct
11	203770	Kallarikoyala	Kannur, Kerala	114	32	144	Long bold	Brown (tawny)	Sterile glumes purplish; husk black tinged; secondary branches many; excellent yield; almost extinct
12	203765	Chingappadan	Kannur, Kerala	60	20	77	long bold	Straw	Average yield; nearly extinct
13	203823	Keeriputhada	Kasaragod, Kerala	82	26	116	Long bold	Brown (tawny)	Flag leaf extra long; primary branches long nearly reaching the tip; rare
14	203776	Mundodan	Malappuram, Kerala	106	24	108	Long bold	Straw	Fairly good yield; excellent cooking quality; rare
15	203815	Chembery collection	Kannur, Kerala	114	32	230	Long bold	Brown furrows	Excellent yield; landrace of "Karimpalar" tribe; rare
16	203767	Veluthanavara	Kannur, Kerala	102	25	103	Long bold	Brown furrows	"Navara" used for cooking purpose; nearly extinct
17	203818	Mullankoyala	Kannur, Kerala	90	27	120	Long bold	Straw	Awned; nearly extinct

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## D. HIGHER ALTITUDE WYNAD AND COORG COLLECTIONS

1	203809	Mattathondi	Wynad, Kerala	92	25	112	Long bold	Straw	Good yielder; rare
2	203799	Onavattan	Wynad, Kerala	82	23	116	Long bold	Brown furrows	Hairy husk; apiculus red; flat grooved grains; fairly good yielder; rare
3	203812	Veliyan/ Kirubeliya	Wynad, Kerala/ Coorg, Karnataka	80	28	92	Long bold	Straw	Most common landrace of Wynad; poor adaptability outside Wynad
4	203808	Chomala	Wynad, Kerala	78	27	139	Long bold	Straw	Poor adaptability outside Wynad; very rare; nearly extinct
5	203807	Marathondi	Wynad, Kerala	88	25	128	Long bold	Straw	Secondary branches many; fairly good yielder; common
6	203788	Thonnuran	Wynad, Kerala	80	26	113	Medium slender	Brown furrows	Fairly good yielder; short duration; common
7	203813	Jeerakasala/jeera kasanna	Wynad, Kerala	80	29	158	Short slender	Straw	Scented rice; poor adaptability in plains
8	203810	Rajani/Channa	Wynad, Kerala	78	27	113	Medium slender	Straw	Scented rice; common in Wynad
9	203801	Gandhakasala	Wynad, Kerala	82	34	172	Short slender	Straw	Most popular scented rice of Wynad; poor adaptability outside Wynad
10	203811	Mullanchanna/ Soojichanna	Wynad, Kerala	60	15	36	Short bold	Straw	Red, awned, scented rice; very poor adaptability outside Wynad; rare
11	203804	Koduveliyan	Wynad, Kerala	90	24	98	Long bold	Straw	Fairly good yielder; common

medicinal value is grown by 'Mavilan' tribe who administer popped rice soaked water to diarrhoea patients.

'Punam' cultivation as well as the landraces for this ecosystem is almost extinct due to non availability of forest land for this purpose. However, few 'Kurichya' families in Kannavam forest still practice this in small plots with their traditional landraces line 'Chingappadan', 'Ambaladan', 'Vellakkoyala', 'Kallarikkoyala', 'Mullankoyala', 'Palkaima', 'Velutha navara' and 'Karutha navara' out of emotional attachment for their traditional cultivars. Broadcasting is done before 'Vishu' (First of the Malayalam month 'Medam') in order to avail the entire growing season. 'Kallarikkoyala' is an ecotype specifically for laterite soils whereas 'Palkaima' has the best cooking quality. 'Chennel' is another 'punam' landrace still grown by 'Naikkar' community in the remote hills of Kasaragod district bordering Karnataka.

In Kasaragod - Bandadka route, a popping quality rice 'Varukkunna nellu' is grown for home consumption. besides its popping quality, it is said to be good for 'payasam' (sweet meat) and rice flour. In the irrigated transplanted belot, good straw yielders are preferred in the second season and 'Cheruvellari' is one such landrace. Collections like IC-203785 ('Nagari'), IC- 203783 ('Undakaima'), IC-203795 ('Koulkaima'), IC-203793 ('Chennel') and IC-203815 (Chemberi collection) are good yielders comparable with control (28 q/ha).

Wild rice species *Oryza meyeriana* ssp. *granulata* grows in abundance in Karulai range of Nilambur forest in newly cleared forest coups and young teak plantations. *O.officinalis* ssp. *malampuzhensis* is also seen growing on the banks of streams and rivulets in the same forest range confirming the earlier report (Vaughan & Muralidharan, 1986). *O.sativa* f. *spontanea* showing varying degrees of introgression is found growing in the entire coastland from Thrissur to Mangalore. *O.rufipogon* is seen restricted to wetlands in Thrissur and Malappuram districts.

### CONCLUSION

Though landraces are still popular, as rice cultivation is less remunerative in Kerala due to many reasons, people go for other crops like cassava, vegetables, ginger, banana, coconut and arecanut after reclaiming paddy fields or prawn culture in 'pokkali' lands. So the threat is more to ecosystem diversity which in turn will lead to genetic erosion.

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