Table 3. Local and traditional rice germplasm collected from Barak Valley

Ahu varieties (8)	Sali varieties (81)	Boro varieties (26)
Ahu berocin, Birashi, Golkimurali, Kachal, Kartica, Mayamoti, Nagamurali, Sunamuki	Agirghalberorein, Agnisail, Amuhail, Asra terabail, Badaya, Badshabhug, Baluchoriasra, Bangonbitchi, Bethi, Bherapowa long awned, Bherapowa short awned, Bherapowa Finegrain, Bodosoyamora, Bothuasra, Borhail, Chabrasail, Chatoki, Chandmoni, Chandramoni, Damdiberoein, Dandaberocin, Doloo berocin, Doomasail, Dolmadhi, Dumay, Godhasail, Eri, Gondhiberocin, Guaroi, Harinarayan, Hasbadalasra and Insanberocin, Jhumberoein red, White, Jhumsoyamora, Joria, Juthaberoein, Kachalo, Kaizuri, Kakhiberoein, Kakirjaliberoein, Kalakura asra, Kalakura asra awned, Kalimakuri, Kalimuki, Kalizera, Kamrang, Koimurali, Khetrasail, Lakhiasra, Lalberoein, Lalpani, Lalsheet, Latha, Lathiberoein, Latma, Laoti, Lanza, Majlasoyamora, Madhumala, Moinasail, Mokhajurya, Moniram, Monthathoi, Mouberoein, Mulahail, Murali, Munshimurali, Mydhani, Naga beroein, Nagasail, Painoili, Pakhiberoein, Paniberoein, Paninoliasra, Parichakasra awnless and awned, Puthiberoein Shabail, Sunasrs, Terabail.	Agrical, Agnisail, Aubera, Auhuga, Atsathi, Balambarua, Basphul, Baruaberoein, Bangonbitchi, Birashi, Chatoki, Chocklat, Gopalari, Gorsibarua, Gosabarua, Gusibarua, Jamilal, Kaiya, Kewla, Koibarua, Lenzabarua, Lahai, Nimoria, Ratha, Sikoibarua, Tufa

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Collection and Evaluation of Kartoli (*Momordica dioica* Roxb. ex. Willd.)

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Key words : *Momordica dioica*, Landraces, Genetic diversity, Superior genotype

Kartoli, family Cucurbitaceae, genus *Momordica* is also known as spine gourd, sweet gourd, kankad and kheksa. Sixty species are reported worldwide of which 7 species occur in India. Kartoli is dioecious in nature and has a wide range of adaptability. It is a rich source of protein and minerals. It possesses several medicinal and curative properties like decoction of leaves reduces fever; tuberous roots help in relieving headache, sweating, stone formation, migraine while fruit is quite helpful in controlling diabetes and blood pressure. It contains aliphatic compounds (Ali and Srivastava, 1998). This prized vegetable has its importance mainly in the areas of their occurrence due to climatic change, physiographic diversity and adaptation. In the Indian sub-continent, it has tremendous scope of acclimatization. It has not only contributed towards food but also is a rich wild gene pool for several important traits. With drastic increase in the world population and fast depletion of natural resources, there is a great need to explore newer sources of vegetables and diversity in the vegetable cultivation to meet the present days' demand.

Kartoli is mainly grown in Orissa, Bihar and West Bengal as a crop and kitchen garden plant but occurs as wild in Punjab, Uttar Pradesh, Rajasthan, Madhya Pradesh, Kerala and Maharashtra under custody of tribals. Kartoli shows enormous diversity in shape, size of the leaf, fruit shape and colour which occurs in semi-domesticated and wild types in local pockets and such types have been selected by native people as a part of their vegetable requirement. Its commercial cultivation is meagre due to unavailability of improved varieties, difficulties in propagation by seeds due to dormancy, low multiplication rate of tubers, dormancy of tubers and unpredictable sex ratio in seedling progeny (Ali *et al.* 1991). An attempt was made to collect and evaluate locally available genetic diversity of Kartoli germplasm.

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A programme for survey, collection and evaluation of natural diversity available in Kartoli (*Momordica dioica*) was initiated during 1997 to 1999. Eighteen female genotypes of diverse nature and two male lines were collected from Vindhyachal hills of Mirzapur in the month of July-August. Collections were made in the form of mature seeds, tuberous roots and parts of the stem (above the ground) for multiplication. The collected seeds/roots/plant material were sown/planted in the month of August-September in the medium for sprouting. The experiments were conducted in RBD considering two replications for two consecutive years. Observations were recorded for 5 randomly selected plants in each replication. The agromorphological characters considered for this study are: tuber size (g), plant height (cm), number of branches/plant, days taken to rooting of soft cutting, days to 50% flowering, days to first fruit set and to edible maturity, days taken from edible maturity to seed maturity, number of fruits/plant, average fruit weight (g) and yield/plant (kg). As a rooting medium "Rootex No-1" was used which is suitable for induction of roots in soft wood cuttings. The study was conducted at the experimental farm, IIVR, Varanasi (U.P.)

On the basis of experimental results, considerable range of variation was recorded for all the characters. Some sampled populations were morphologically similar. Considerable variability were recorded in fruit morphological traits including fruits shape (round, oblong), base (roundish, broad, conical), apex (narrowly round, roundish, conical round), colour at edible maturity (dark greenish, light yellowish) and taste (sweet). It was observed during the exploration that the edible maturity differs greatly from plant to plant.

It may be probably due to new plant development by seed cuttings or newly sprouted tubers or due to geographical variation. Table 1 reveals that under-weight tubers (10 g) start sprouting quite late (20-25 days) and sprouts were weak and slender. Medium-size tubers (11-15 g) took 18-20 days for sprouting but plant stand was quite vigorous. Over-size tubers in general sprout within 15-16 days and sprouts were quite vigorous but showed poor root development. Promising genotypes were MD-4, 8, 9, 11 and 15.

Table 1. Categorization of Kartoli on the basis of tuber size and sprouting

Tuber size	Tuber weight (g)	Days taken to sprouting of tubers after planting	Growth	Accessions
Low size	<10	20-25	Sprouts are weak and cylindrical	MD-1, 13,14,16
Medium size	11-15	18-22	Vigorous	MD-4, 8,9,11,15
Big size	>16	15-16	Very vigorous but growth is poor	MD-2,3,5,6, 7,10,12, 17,18

In Kartoli, seed germinates 30-35 days after sowing. Flowering occurs after 56 (male flower) and 54 (female flowers) days after sowing/planting. It attains the edible fruit maturity in 88 days and seeds mature after 98-105 days of sowing. Tuberous roots sprout very early (16-20 days) and start flowering within 40 days, which attain the edible fruit maturity within 72 days. Findings indicate that medium size tuberous roots are the best planting material. In cuttings, only 36% plants survived. With respect to yield potential, maximum yield was recorded by tuber raised crop (3.3 kg/plant) followed by cuttings (2.8 kg/plant). Minimum yield was recorded in seed propagated crop (Table 2).

Quantitative characterization of the Kartoli germplasm (Table 3) Line MS-15 and MD-18 yielded maximum, *i.e.* 2.85 and 2.80 kg/plant, respectively, with an average yield of 1.94 kg/plant. Shaw *et al.* (1998) isolated one genotype "RMF 37" for maximum fruit yield from this collection, which was less affected by damaging insect.

Maximum number of fruits/plant recorded is MD-16 (120) followed by MD-17(110). Individual fruit

Table 2. Yielding ability and morphological variation in the context of propagation

Method of propagation	Yield (kg)	Days taken to germination/ sprouting/rooting	Days to first male flowering	Days to first female flowering	Days to first fruit set	Days to edible fruit maturity (days)	Days to seed maturity (days)
Seed	1.45	30-35	56	54	61	88	98-105
Tubers	3.30	16-20	46	40	55	72	85-90
Cutting (treated with rootex no.-1)	2.80	28-30	50	45	50	80	93-95

Table 3. Characterization of collected germplasm

Accession	Plant height (cm)	No. of fruits/ plant	Individual fruit weight (g)	No. of seed/ fruit	Branches/ plant	Yield/ plant (kg)
MD-1	2.80	95	18.00	16	9	2.33
MD-2	1.95	72	13.60	22	10	1.50
MD-3	2.45	98	15.00	20	8	1.97
MD-4	2.60	88	12.20	15	11	1.45
MD-5	3.30	105	16.20	23	16	2.85
MD-6	1.50	45	19.40	18	12	1.65
MD-7	3.50	102	14.00	20	10	2.22
MD-8	3.95	87	13.00	12	14	2.38
MD-9	2.20	48	10.50	19	8	1.85
MD-10	1.54	32	8.20	23	13	1.20
MD-11	1.68	55	10.50	21	14	1.85
MD-12	2.95	101	11.65	14	15	2.43
MD-13	3.00	95	12.42	17	12	2.00
MD-14	2.25	80	9.30	10	8	1.20
MD-15	1.65	90	8.20	16	6	1.00
MD-16	3.40	120	13.00	22	14	2.30
MD-17	3.00	110	11.00	17	10	2.00
MD-18	3.10	105	12.00	26	19	2.80
Mean	2.59	84.88	12.68	18.38	11.61	1.94
Range	1.50-3.95	32-120	8.20-19.4	10-23	6-19	1.00-2.85

weight, which determines the yield, fruit varies greatly (8.20–19.4). Seeds of Kartoli are round and differ greatly from other species of *Momordica*. More number of seeds/fruit was counted in MD-6 and MD-10 each of 23. More number of seeds in a fruit is not a desirable character in Kartoli. So, less-seeded genotypes *i.e.* MD-14(10) and MD-8(12) were considered as best genotypes. Both the selected genotypes were soft-seeded and more fleshy. It is true that more number of fruits were born on thinner branches. For this trait MD-18(19) and MD-5(16) were considered best genotypes among the accessions available. MD-5 genotype yielded poor due to less number of branches.

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Interception of Insect and Mite Pests in Germplasm under Exchange during the Year 2000

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Key Words: Insect, Mites, Interceptions, Germplasm, Quarantine

Exchange of planting material has a significant role in diversifying and stabilizing agricultural production but involves an inherent risk of introduction of exotic pests in a given geographical area. The role of quarantine is important in preventing the possible entry of exotic pests, which may accompany the incoming and planting material. It is on record that distribution of several pests and pathogens have resulted from the movement of infested germplasm and the introduced pests have proved more dangerous in the new areas as they can flourish unchecked by their natural enemies. The importance of plant quarantine is indicated in the number of interceptions of insects and mites made during previous years, which include *Bruchidius glycyrrhizae* (Fab) in *Glycyrrhiza uralensis* from USSR, *Bruchophagus mellipes* in *Sesbania* spp. from Philippines and *Megastigmus aculeatus* in *Rosa* spp. from N. Arctic Region (Mathur and Lal, 1996).

A total of 1,22,365 samples (1,22,183 imported and 182 exported) comprising seeds, tubers, bulbs, suckers, rhizomes, cuttings, seedlings and rooted plants of different crops and their wild relatives were received for quarantine clearance in the year 2000. These samples were examined visually, under high magnification and the seeds of plant