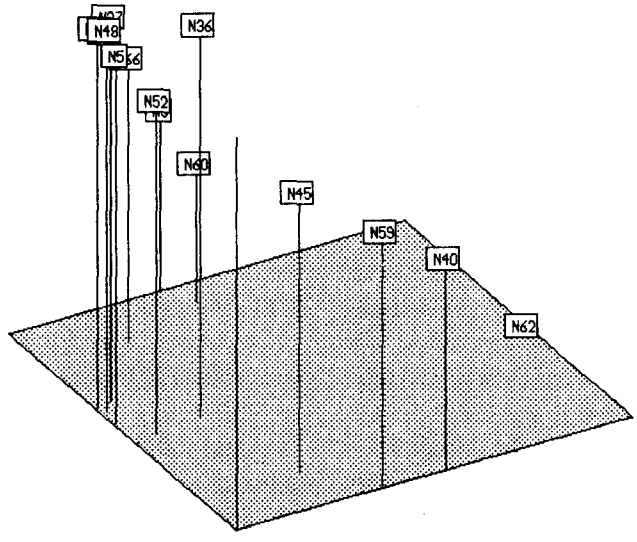

Fig. 2. Principal component analysis based on AFLP study of 14 neem lines with 523 amplicons

The present study revealed that there is large genetic diversity between the samples collected from different part of the western states of India, which is corroborated by studies of Singh *et al.* (1999). Future explorations can be carried out in these states for germplasm collections. To understand more about the extent and organization of genetic diversity of this species more exhaustive study by using more number of primers and marker systems is required.

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"Kairali" – A Mosaic Resistant Vegetable Cowpea

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Vegetable cowpea is cultivated on commercial scale in Kerala. Incidence of mosaic diseases caused by viruses is a major handicap in its cultivation and the disease is very severe in summer season and is quiet difficult to control. Cultivating resistant varieties is the most economical and practical method to tackle this disease. Immunity/resistance to mosaic disease have been reported in grain cowpea by Khatri and Singh (1974), Patel *et al.* (1982) and Doraiswamy *et al.* (1983). Cowpea mosaic virus symptoms, transmission and host range studies were reported by Sreelekha (1987) from Kerala. However, no cultivars of vegetable cowpea grown in Kerala are found resistant to mosaic disease. Hence, a breeding programme was initiated to evolve mosaic resistant vegetable cowpea with good yield and pod characters suited to large scale cultivation in Kerala.

The technical programme consisted of collection of germplasm with special reference to mosaic resistant accessions and local cultivated types, cataloguing the germplasm for mosaic incidence, growth and yield attributes to locate resistance, sap inoculation of viruses to confirm the resistance in the resistant accessions

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located, and evaluation of resistant accessions for pod and yield attributes in comparative yield trials and farm trials. Screening of the germplasm to locate the sources of resistance was done in initial evaluation trials (IET) for two years, using 91 accessions (including 8 introduced from IITA, Ibadan) in summer seasons of 1996 and 1997. Genotypes were grouped into resistant (0–10% incidence); tolerant (11-30%); susceptible (31-60 %); and highly susceptible (61-100%) based on the disease incidence. It was observed that most of the resistant accessions belonged to grain types. Two accessions with comparatively good pod characteristics for vegetable purpose such as CWP-11 (IC 45415) and CWP-16 (Co. 2) were found to be resistant. Careful selection of plants from the original population of CWP-11 for longer pods resulted in an improved accession, CWP-11-1. They were subjected to artificial sap inoculation in April, 1997 and found to be resistant. This was followed by three seasons comparative yield trials (CYT) and farm trials. CWP-11-1 is entered in the All India Co-ordinated Vegetable Improvement Project (AICVIP) trials for testing at national level also.

Two season's IET have shown that no vegetable types (with long, tender pods of 40-50 cm, and trailing growth habit) were resistant. However, two semi-trailing accessions *viz.*- CWP-11 (pink pods) and CWP-16 (light green pods) were found mosaic resistant, having satisfactory medium long, tender pods. CWP-11-1 is a selection with longer pods. Three season's CYT confirmed that the accessions CWP–11 and CWP-16 were mosaic resistant with high yields (Table 1). CWP-11-1 is a semi-trailing type with a mean vine length of about 120 cm at harvest stage and characterised by green stem with pink streaks dark green leaves with green veins green petiole with pink streaks at basal portion; pink pods with a mean pod length of 22.78 cm, mean pod weight of 7.08 g, mean seed content of 16 per pod plumby reddish brown seeds of 10.6 –11.0 mm length and 6.0 mm width, and 100 seed weight of 16.8 to 18.0 g. Plants take 37-42 days for flowering, 47-54 days to first harvest, and have a total crop duration of 95-108 days. Generally it gives 7-9 harvests and gives a yield of 7.13 tonnes of pods/ha under average management; and has a potential yield of 9 tonnes/ha. The variety is consistently found to be resistant to aphid transmitted cowpea mosaic disease (incidence varied from 0 to 6.67%) under field conditions. It is tolerant to aphids and pod borer. Pods of CWP-11-1, being pink in colour, had market preference; CWP-11-1, on an average gave a yield of 8.65 tonnes pods/ ha in the farm trials. CWP-11-1 is found to be highly acceptable to farmers due to its mosaic resistance, high yield and good market preference. This variety may be given adequate isolation from "Vyjayanti" plots to avoid mixing of seeds, since both these varieties have reddish brown seeds. This variety is now being tested under various centres of AICVIP at national level. This has been recommended for release in Kerala by the State Seed

Table 1. Mean performance of selected cowpea genotypes

Acc. No.	Mosaic incidence at harvest (%) IET-I	Mosaic incidence at harvest (%) IET-II	Pod length (cms) CYT-I (June-Sept. 1997)	Yield of pods Kg/2.4 sq m CYT-I (June-Sept. 1997)	Mosaic at harvest (%) CYT-II Oct. 97-Jan. 98)	Pod borer %, CYT-II (Oct. 97-Jan. 98)	Yield of pods, kg/2.4 sq m CYT-I (Oct. 97-Jan. 98)
CWP 11-1	6.67	8.00	17.7	1.94	4.50	14.5	1.72
CWP 16	3.57	27.5	20.9	1.88	1.66	7.25	0.87
VS 15-3-1	53.8	80.0	32.8	1.94	26.3	31.5	1.80
VS 15-1	56.7	69.3	23.5	0.99	43.3	28.0	1.52
VS 19-2	28.2	75.0	24.1	1.39	37.5	39.0	1.19
VS 35	30.0	92.9	13.6	0.69	45.0	0.00	0.68
VS 36	55.2	76.8	16.6	1.71	38.8	19.3	0.49
VS 37	37.5	77.0	14.2	0.92	30.0	6.30	0.91
VS 42	44.6	-	20.1	1.19	61.7	40.0	0.39
VS 80-1	57.1	50.0	19.7	1.20	45.0	35.0	1.26
VS 95	-	50.0	18.5	1.89	17.5	29.3	1.19
VS 96	-	32.0	29.4	1.55	22.5	14.8	1.27
VS 98	33.8	86.0	22.5	1.18	20.0	24.0	1.15
VS 99	48.0	60.3	20.0	1.33	20.0	4.00	1.06
CD (P=0.05)	-	-	2.19	NS	-	-	0.39

sub committee under the name " KAIRALI " for commercial cultivation.

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Biodiversity in Banana Cultivars of Genomic Group AB

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Key Words: Evaluation, Banana, Nutrition value, Pollen characters

Biodiversity in the cultivars of banana, which consist mainly of diploids is complex, with combinations of different degrees of expression of the parental species. The cultivars grown for commercial purposes are many, and the range of productivity and quality characters are also very wide (Raman,1970). The wide variablity occurring in South Indian bananas mainly belonging to the genomic group AB, definitely requires a detailed study for proper understanding. Further, banana cultivars of AB are recognized as the gene pool for imparting resistance to leaf spot and wilt (INIBAP, 2001).

Studies on banana cultivars belonging to the genomic group AB described by Jacob (1966) were carried out at the College of Horticulture, Vellanikkara, Thrissur, Kerala, They were scored based on the 15 morphological characters, diagnostic of *Musa acuminata* Colla and *Musa balbisiana* Colla as suggested by Simmonds and Shepherd (1966) to confirm the genomic group. Ploidy levels were confirmed by cytological studies which consisted of making somatic root-tip chromosome counts of all the cultivars (Darlington and La Cour, 1976). The quantitative, plant, fruit and pollen characters were determined and the genetic divergence was estimated.

The growth parameters of 12 cultivars of banana belonging to the AB genomic group are described in Table 1. The height of the plant at the time of flowering varied from 227 cm in Vannan to 362 cm in Venneettu mannan. The variation in girth was from 44.80 cm in

Table 1. Mean values of the growth parameters of cultivars of banana belonging to AB genomic group

Cultivars	Growth parameters				
	Height (cm)	Girth (cm)	Leaves/ plant	Leaf area/ plant (m^2)	Petiole length (cm)
Krishna vazhai	237.00	58.00	21.75	19.93	34.25
Vannan	227.00	52.50	18.25	17.33	32.75
Virupakshi	251.00	54.00	19.25	17.51	53.75
Sirumalai	229.00	52.50	21.00	17.25	33.00
Agniswar	232.50	44.80	29.50	23.82	37.25
Adakka kunnan	246.00	62.25	31.25	31.87	67.50
Valiya kunnan	234.50	59.50	29.50	33.13	59.50
Thaen kunnan	245.00	51.50	36.00	34.82	39.25
Padali moongil	232.50	46.25	28.25	18.14	60.75
Ney poovan	280.50	55.50	27.25	19.36	56.75
Kostha bontha	315.50	69.50	35.67	28.88	54.25
Venneettu mannan	362.00	77.50	31.00	34.22	66.75
CD (0.05)	9.17	6.08	1.09	0.10	1.71