

**ALL INDIA CO-ORDINATED
CASHEW IMPROVEMENT PROJECT**

**ANNUAL REPORT
1995-96**

**CASHEW RESEARCH STATION
KERALA AGRICULTURAL UNIVERSITY
MADAKKATHARA-680 656
THIRISSUR, KERALA, INDIA**

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GENERAL INFORMATION

Project Title : All India Co-ordinated Cashew Improvement Project (AICCCIP)

Project Code : 176

Report No. : 25

Date of Start : 01..05..1973

Period of Report: 01..04..1995 to 31..03..1996

Sponsored by : Indian Council of Agricultural
Research, Krishi Bhavan,
New Delhi.

Centre : Cashew Research Station
Madakkathara - 680 656
Kerala Agricultural University
Thrissur District, Kerala State.

Present Staff position

Name of Post	Name of Personnel in Position	Date of Position Vacant post
Associate Professor (Rs. 3700-5700/-)	Dr. M. Abdul Salam Associate Professor (N.C)	01.02.1995 onwards
Assistant Professor (Rs. 2200-3500/-)	Dr. Susannamma Kurien Associate Professor (N.C)	03.04.1995
Sr. Technical Assistant (Rs. 2200-3500/-)	Smt. B. Suma Assistant Professor	01.03.1994
Farm Assistant Grade I (Rs. 1350-2200/-)	Sri. C. Gireesan	05.06.1987
Grafter (Rs. 875-1065/-)	Sri. P.S. Retnakumar	31.10.94

FINANCIAL OUTLAY OF THE PROJECT

year	Total sanctioned grant			Total amount spent		
	Recurring (Rs.)	Non- Recu. (Rs.)	Total	Recurrin g(Rs.)	Non- Recu(Rs.)	Total
1972-73 to 1977-78	2,95,110	86,000	3,81,110	2,76,060	33,543	3,09,603
1978-79 to 1979-80	1,33,908	---	1,33,908-	1,41,912	---	1,41,912
1980-81 to 1984-95	4,99,000	50,000	5,49,000	5,87,954	7,472	5,95,426
7th plan						
1985-86	80,000	---	80000	1,29,657	---	1,29,657
1986-87	1,63,000	---	1,63,000	1,65,704	---	1,65,704
1987-88	1,65,000	50000	2,15,000	1,72,800	56417	2,29,217
1988-89	1,69,000	---	1,69,000	1,87,617	---	1,87,617
1989-90	1,72,000	---	1,72,000	2,45,053	---	2,45,053
1990-91	1,91,800	---	1,91,800	2,20,477	---	2,20,477
1991-92	3,36,800	---	3,36,800	2,32,766	---	2,32,766
1992-93	2,81,000	45000	3,26,000	3,40,072	45000	3,85,072
1993-94	3,06,000	---	3,06,000	2,92,943	---	2,92,943
1994-95	3,54,000	85,000	4,39,000	3,58,633	51445	4,10,078
1995-96	2,95,000	---	2,95,000	4,56,088	---	4,56,088

TECHNICAL PROGRAMME FOR THIS CENTRE AS APPROVED IN THE NATIONAL GROUP DISCUSSION OF CASHEW RESEARCH WORKERS HELD AT CPCRI KASARGOD FROM 30th AUGUST TO 1st SEPTEMBER 1991

Crop improvement

- i) Gen-1 Germplasm collection, maintenance, evaluation and description of types
- ii) Gen-3 Expt. 2 Multilocal trial with the 18 cashew varieties/ hybrids from Vittal, Vridhachalam, Vengurla, Madakkathara and Bapatla
- iii) Gen-3 Expt. 3 New multilocal trial with varieties from Bapatla, Vengurla, Vridhachalam and NRCC, Pullur
- iv) Gen-4 Hybridisation and selection

Propagation and root stock studies

- i) Screening of Cashew root stocks at nursery stage for the use as dwarfing root stock
- ii) Top working trials in Cashew - large plot trial on top working

Agonomy

- i) NPK fertilizer experiment

Crop protection

- i) Chemical control of pest complex in Cashew
 - (a) Tea mosquito
 - (b) Control of minor pests
- ii) Control of stem and root borer in Cashew - prophylactic control
- iii) Bio-ecology of pests of regional importance and survey of pest complex and natural enemies
- iv) Screening of germplasm to locate tolerant/resistant types to major pests of the region

1 Crop improvement

Gen-1.a Germplasm collection, maintenance, evaluation and description of types

Principal Investigator: Dr. M. Abdul Salam (From 1-2-95)

A total of 120 accessions collected till 1996 are planted for evaluation in the clonal germplasm conservation block.

The biometric and yield characters of all the accessions planted during 1988-91 were recorded and presented in Table 1.

II-3-9 and Anakkayam-1 gave the highest yield of (2.6 Kg/tree) followed by II-1596 and A-26-2 (2.4 Kg/tree) during 94-95.

K-30-1 gave highest hundred nut weight of 11.90 gram followed by II-8-15 (10.80 gram). The apple weight was highest with Brazil-239 (145 gram) followed by Brazil-241 (142 grams). The yield data of 1996 is not furnished since the harvest is continuing.

New material obtained during 1996

Two types of cashew (seed), of Malavi and Brazil origin obtained through a cashew industrialist Mr. Anu S. Pillai, Anu Cashews, Quilon is planted in our nursery. The seedlings will be planted in the germplasm soon.

Sl.No	Source of collection	No of accessions collected	Remarks
1	Republic of Panama	14	Not listed in Table 1
2	Cashew farm. Kottarakkara	13	
	C.R.S Madakkathara	26	
	C.R.S Anakkayam	24	
3	NRCC, Puttur	8	
4	Bapatla	8	
5	Vengurla	8	
6	Jhargram	1	
7	Vittal	2	
8	Farmers fields in Kannur and Palaghat districts of Kerala	16	
	Total	120	

Table 1 Biometric and flowering characters of the accession in clonal germplasm conservation block (94-95)

SLNo	Acc. No	Source	Yr.of Planting	Dt of I flowering	Apple wt (g)	Apple colour	100 nut wt.(g)	Tree canopy	Yield 93-94 (kg)	yield94-95
1	2	3	4	5	6	7	8	9	10	11
15	Brazil-2	Cashew from Kottarakkara	1988	5.11.94	120	Orange Red	760	Erect	0.55	1.85
16	Brazil-3	"	1988	6.11.94	82	Yellow	-	Erect	0.45	1.3
17	Brazil-120	"	1988	5.11.94	107	Orange Red	779	Semi Erect	1.15	1.53
18	Brazil-239	"	1988	3.11.94	145	Orange Red	1022.5	Erect	0.67	1.67
19	Brazil-241	"	1988	6.11.94	142	Orange Red	874.55	Erect	0.3	
20	Brazil-244	"	1988	6.11.94	89	Yellow	698.76-	Semi Erect	0.5	0.55
21	Brazil-248(m)	"	1988	7.11.94	-	Yellow	793.1-	Erect	-	0.63
22	Brazil-248	"	1988	1.11.94	55	Red	715.8	Erect	0.4	1.1
23	KTR-27	"	1988	6.11.94	89	Orange Red	704.3	Semi Erect	0.45	1.3
24	Puruthiyara	"	1988	5.11.94	140	Orange Red	701	Semi Erect	0.37	1.2
25	Vapala	"	1988	14.11.94	58	Orange Red	835	Semi Erect	1.31	2.33

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1	2	3	4	5	6	7	8	9	10	11
26	Anakkayam-1	CRS Madakkathara	1988	25.10.94	45	Yellow	505	spreading	2.86	2.6
27	BLA-39-4	"	1988	29.10.94	50.0	Yellow	580	Bushy	1.26	1.75
28	K-22-1	"	1988	5.11.94	86.3	Orange Red	344.4	Semi erect	0.28	0.4
29	NDR-2-1	"	1988	7.11.94	55.0	Orange red	685.7	Erect	1.38	1.15
30	H-3-13	"	1988	5.11.94	88	Orange red	427.5	Erect	0.95	1.9
31	H-3-17	"	1988	5.11.94	69.1	Orange red	581.4	Semi erect	0.68	1.71
32	H-680	"	1989	4.11.94	81.5	Orange red	435.7	Spreading	0.15	1.33
33	H-682	"	1989	7.11.94	58.5	Orange red	436	Semi erect	0.3	2.1
34	H-718	"	1989	4.11.94	66.9	Yellow	532	Erect	0.75	2.13
35	H-719	"	1989	6.11.94	73.8	Red	382.11	Semi erect	0.43	0.75
36	H-855	"	1989	16.11.94	57.0	Yellow	107.3	Semi erect	0.3	1
37	H-1538	"	1989	10.11.94	122.5	Orange red	861	Semi erect	1.67	0.8
38	H-1539	"	1989	4.11.94	81.0	Orange red	1028	Erect	0.6	1.52
39	H-1591	"	1989	7.11.94	..	Orange red	..	Erect	0.18	0.95
40	H-1593	"	1989	7.11.94	73.0	Yellow	615.4	Semi erect	0.33	2.2

Cont.

1	2	3	4	5	6	7	8	9	10	11
41	H-1596	CRS Madakkathara	1989	7.11.94	-	-	-	Erect	0.15	2.4
42	H-1597	"	1989	5.11.94	61.5	Yellow	548	Semi erect	0.29	1.8
43	H-1598	"	1989	4.11.94	67.5	Yellow	422	Erect	0.55	1.58
44	H-1600	"	1989	05.11.94	70.5	Orange red	597.9	semi erect	1.2	1.67
45	H-1602	"	1989	05.11.94	-	Orange red	816.3	Semi erect	0.48	1.63
45	H-1608	"	1989	7.11.94	0	Yellow	754	Semi erect	0.35	1.3
47	H-1610	"	1989	7.11.94	75.5	Yellow	983.3	Semi erect	0.10	0.47
48	M-1-2	"	1989	7.11.94	47.0	-	-	Erect	0.59	1.4
49	A-26-2	"	1989	5.11.94	43.5	Red	610	Semi erect	1.61	2.4
50	PTR-1-1	"	1989	16.11.94	37.0	Red	-	Semi erect	0.1	0.87
51	A-6-1	"	1989	7.11.94	65.6	Orange red	684	Semi erect	1.24	0.67
52	PU-1	NRCC, Puttur	1989	6.11.94	-	-	-	Erect	0.6	0.4
53	PU-2	"	1989	5.11.94	-	-	-	Semi erect	-	0.1
54	PU-4	"	1989	6.11.94	-	-	802.9	Semi erect		
55	PU-6	"	1989	6.11.94	-	-		Erect	0.4	0.43

1	2	3	4	5	6	7	8	9	10	11
56	PU-7	NRCC, Purtur	1989	6.11.94	110	-	824	S	1.1	1.3
57	PU-8	"	1989	6.11.94	97.5	-	948.9	S	0.81	1.53
58	Rajamundri	CRS Bapatla	1989	5.11.94	60.4	Yellow	489	S	0.58	0.3
59	UL-12-2	CRS Anakkayani	1989	7.11.94	90.0	Red	450	B	-	0.97
60	Brazil-8	"	1989	6.11.94	65.0	-	635	E	-	1.83
61	K-3-1	"	1989	6.11.94	86.7	-	-	S	0.31	0.25
62	K-3-2	"	1989	7.11.94	75.0	-	-	S	-	0.4
63	K-4-1	"	1989	7.11.94	-	-	-	S	-	0.15
64	K-4-2	"	1989	14.11.94	-	-	-	S	-	1.95
65	K-10-1	"	1989	15.11.94	91.3	Orange red	780	S	0.85	1.45
66	K-10-2	"	1989	7.11.94	92.3	Orange red	840	S	0.36	0.47
67	K-16-1	"	1989	8.11.94	73.8	Yellow	840	S	0.39	0.65
68	K-18-2	"	1989	15.11.94	61.0	Orange red	492.6	S	0.45	0.38
69	K-19-1	"	1989	4.11.94	49.5	Orange red	599	S	0.57	0.43
70	K-19-2	"	1989	4.11.94	-	Orange red	-	S	0.81	0.65

Cont.

1	2	3	4	5	6	7	8	9	10	11
71	K-30-1	CRS Anakkayam	1989	7.11.94	95	Orange red	1190.9	Semi erect	0.2	0.65
72	H-3-4	"	1989	8.11.94	100.5	Yellow	719	Semi erect	0.11	1.5
73	H-3-9	"	1989	7.11.94	107.8	Yellow	760.2	Erect	1.05	2.63
74	H-7-6	"	1989	16.11.94	96	Yellow	930	Erect	0.58	1.93
75	H-8-1	"	1989	6.11.94	73.5	Orange red	880.2	Semi erect	1.29	0.65
76	H-8-6	"	1989	7.11.94	76.5	Orange red	810	Erect	0.71	0.43
77	H-8-7	"	1989	16.11.94	58.0	Orange red	905.7	Erect	0.96	0.27
78	H-8-8	"	1989	8.11.94	80	Orange red	891.4	Semi erect	1.10	0.1
79	H-8-10	"	1989	18.11.94	-	Orange red	-1002.5	Erect	0.12	0.4
80	H-8-15	"	1989	11.11.94	76.5	Red	1080	Semi erect	0.73	0.77
81	H-9-3	"	1989	8.11.94	51.5	Orange red	930	Semi erect	0.72	0.45
82	BLA-2-255-4	"	1989	10.10.94	-	Yellow	1011	Semi erect	0.38	-
83	Payam-1	Farmers field	1992	-	-	-	468.1	-	-	-
84	Payam-2	"	1992	-	-	-	-	-	-	-
85	Kiliyanthara	"	1992	-	-	-	733.7	-	-	-

Cont.

1	2	3	4	5	6	7	8	9	10	11
86	Kilokam-1	Collected from farmers field	1992	-	-	-	467.9	-	-	
87	Kilokam-2	"	1992	-	-	-	583.3	-	-	
88	Ambayathode	"	1992	-	-	-	616.7	-	-	
89	Ulikkal-1	"	1992	-	-	-	487	-	-	
90	Ulikkal-2	"	1992	-	-	-	-	-	-	
91	Ulikkal-3	"	1992	-	-	-	-	-	-	
92	Ulikkal-4	"	1992	-	-	-	-	-	-	
93	Ulikkal-5	"	1992	-	-	-	-	-	-	
94	Ulikkal-6	"	1992	-	-	-	-	-	-	
95	Anadapally	"	1992	-	-	-	-	-	-	
96	Kottarakkara	DAF Anchal	1992	-	-	-	-	-	-	
97	Anakkara	"	1992	-	-	-	-	-	-	
98	Vetore-56	Vengurla	1993	-	-	-	-	-	-	
99	Kankady	"	1993	-	-	-	-	-	-	
100	KTR-1-254	Kottarakkara	1993	-	-	-	-	-	-	
101	K-1	Farmers field	1993	-	-	-	-	-	-	
102	KTR-1-306	Kottarakkara	1993	-	-	-	-	-	-	

Table 1 contd Details of Accessions of released varieties collected from other centres

1	2	3	4	5	6	7	8	9	10	11
1	BPP-1	Bapatla	1990	-	-	-	583.3	-	-	
2	BPP-2	"	1990	05.11.94	-	-	563	-	-	
3	BPP-3	"	1990	-	-	-	-	-	-	
4	BPP-4	"	1990	06.11.94	-	-	-	-	-	
5	BPP-5	"	1990	07.11.94	-	-	468.3	-	-	
6	BPP-6	"	1990	-	-	-	633.3	-	-	
7	V-1	Vengurla	1990	05.11.94	-	-	604	-	-	
8	V-2	Vengurla	1990	07.11.94	-	-	-			
9	V-3	"	1990	-	-	-	-			
10	V-4	"	1990	-	-	-	-			
11	V-5	"	1990	05.11.94	423	-	-			
12	V-6	"	1993	-	-	-	-			
13	VTH-711	Vittal	1991	-	-	-	-			
14	VTH-711/4	Vittal	1991	04.11.94	-	-	-			
15	Jhargram	Jhargram	1991	06.11.94	558	-	-			
16	Rajapalayam	Bapatla	1991	05.10.94	491	-	-			
17	NRCC-Sel-1	NRCC, Puttur	1991	03.11.94	-	-	-			
18	NRCC-Sel-2	NRCC, Puttur	1993	30.11.94	853	-	-			

Gen-3 Expt.2 Multilocal trial with 18 Cashew varieties/hybrids from Vittal, Bapatla, Vengurla, Vridhachalam and Madakkathara.

Principal Investigator : Dr. M. Abdul Salam (From 1-2-1995)

The experiment was laid out in June 1987.

Design : Randomised Block Design

Treatment : 18 (see Table 2)

Replications : 3

No. of plants/treatment : 4

Spacing : 7.5 m x 7.5 m

Planting material : Soft wood grafts

Date of planting : 15. 06. 87

All the cultural practices and plant protection measures were given to the trees as per the package of practices recommendations. Observations of plant height, stem girth (0.5 m above ground), canopy shape, nut weight, apple weight and nut yield were recorded. The mean data are given in Table 3 and 4. Mean yield of varieties during last 5 years and cumulative yield for 5 years (90-91 to 94-95) are given in Table 4. Based on the nut yield (cumulative yield for 5 years), the varieties can be rated as follows.

1.	M -26/2	: 44.6 kg
2.	M-44/3	: 44.3 kg
3.	II-1598	: 43.2 kg
4.	V-5	: 39.6 kg
5.	AKM-1	: 36.3 kg
6.	II-1608	: 34.7 kg

Table 2 Details of varieties planted in the MLT

Sl.No	Treatment No.	Variety	Source
1	T1	H-1598	Madakkathara
2	T2	H-1600	"
3	T3	H-1608	"
4	T4	H-1610	"
5	T5	VTH 30/4	Vittal
6	T6	VTH 59/2	"
7	T7	Tree NO. 129	Bapatla
8	T8	Tree No. 40	"
9	T9	II-2/15	"
10	T10	II-2/16	"
11	T11	Vengurla-2	Vengurla
12	T12	Vengurla-3	"
13	T13	Vengurla-4	"
14	T14	Hybrid 24 (v5)	"
15	T15	M-33/3	Vridhachalam
16	T16	M-44/3	"
17	T17	M-26/2	"
18	T18	Anakkayam-1 (Check variety)	Madakkathara

Table 3 Growth and yield characters of different cashew varieties in MLT(1995-96)

Sl.No	Variety	Height(m)	Girth(cm)	Canopy spread	Canopy Shape	Apple weight	Nut weight
1	H-1598	7	94.3	9.1	Compact	67.14	5.9
2	H-1600	6.4	89.3	8.65	Medium	84.8	10.1
3	H-1608	5.77	88.3	8.28	Compact	71.2	7.83
4	H-1610	7.27	89.3	8.83	Medium	95.3	8.25
5	VTH-30-4	6.43	85.7	7.87	Compact	49.8	5.72
6	VTH-59-2	6.03	77	8.03	Medium	90.0	8.13
7	T-129	5.4	88.3	8.12	Medium	48.8	5.67
8	T-40	6.3	83.3	7.93	Compact	75.75	5.38
9	T-2.15	6.2	85	9.92	Compact	74.1	7.47
10	T-2.16	5.8	85.7	8.83	Medium	81.67	9.35
11	V-2	6.7	85.7	9.22	Medium	67.2	5.43
12	V-3	7.3	87	9.73	Sparse	72.13	7.81
13	V-4	6.57	83.3	8.85	Medium	82.8	8.72
14	V-5	6.53	89	9.28	Compact	19.88	3.50
15	M-33/5	6.03	82.7	8.63	Medium	87.7	7.57
16	M443	5.4	65.5	7.45	Compact	41.1	5.18
17	M-26/2	7.17	93	8.91	Compact	55.1	7.47
18	Arakkayam	5.83	73.7	8.12	Medium	46.8	5.43
SE _m		0.163	0.03	0.196			
CD		NS	NS	NS			

TABLE 4 Yield data of MLT Varieties (Kg.)

SLNo.	Variety	3 YAP 1990-91	4 YAP 1991-92	5 YAP 1992-93	6 YAP 1993-94	7 YAP 1994-95	Cum.yield for (5 years)
1	H-1598	4.642	3.630	11.670	12.17	11.04	43.15
2	H-1600	2.592	4.960	11.330	8.20	6.8	33.88
3	H-1608	2.975	2.683	11.970	9.33	7.77	34.73
4	H-1610	0.558	1.775	8.167	5.13	2.2	17.83
5	T-30/4	2.025	3.275	9.833	7.60	9.73	32.46
6	T-59/2	1.842	3.583	9.170	5.27	5.57	25.44
7	T-129	0.870	1.790	5.900	3.03	3.46	15.05
8	T-40	0.908	3.167	5.230	4.50	4.67	18.48
9	H-2/15	1.470	1.842	6.470	7.33	8.03	25.14
10	H-2/16	1.496	1.708	7.867	4.80	4.81	20.68
11	V2	1.275	2.833	7.267	4.27	5.26	20.91
12	V3	1.658	3.000	11.52	8.73	7.09	31.99
13	V4	1.312	2.575	11.83	7.53	6.91	30.16
14	V5	1.458	3.177	9.000	12.10	13.89	39.63
15	M-33/3	1.900	3.670	11.150	7.30	5.41	29.43
16	M-44/3	5.475	6.808	10.700	11.20	10.17	44.35
17	M-26/2	3.379	6.583	14.470	10.00	10.22	44.65
18	AKM-1	2.695	2.117	11.000	10.87	9.64	36.28
	CD				2.15	3.21	

Gen-3 Expt.3 Varietal evaluation - Multilocal trial with 14 varieties from Bapatla, Vengurla, Vridhachalam and NRCC (New MLT)

Principal investigator: Dr. M. Abdul Salam

As per the decision of the National Group Discussion of Cashew Research Workers held at C.P.C.R.I., Kasargod from 30th August to 1st September 1991, a new multilocal trial with the following varieties was laid out at the centre.

SOURCE -----	VARIETIES -----
Bapatla	: T.No.30/1, 3/33, 10/19, 3/28
Vengurla	: Ily.68, 367, 303, 255, 320
Vridhachalam	: Vr.1-2, M-15/4
NRCC	: 107/3, 40/1

Softwood grafts of the above varieties have been collected from the concerned centres. The experiment was laid out during October 1993. The plants have been established well.

Observations on plant height, girth and canopy spread were recorded during 1996 (3 YAF). The data are presented in table 5.

There was no significant difference in growth characters in terms of plant height, girth and canopy spread between the 14 varieties tried in this experiment during the 3rd year of planting.

TABLE 5 Growth characters of plants in the new MLT

Sl.No.	Variety	Source	Height (m)	Girth (cm)	Canopy spread (m)
1	T.No.30/1	Bapatla	2.95	29.5	3
2	T 3/33	Bapatla	2.93	22.1	2.61
3	T 10/19	Bapatla	2.63	23.2	2.85
4	T 3/28	Bapatla	2.7	24	3.55
5	IY-68	Vengurla	3	28.1	2.83
6	IY-367	Vengurla	2.2	26.4	2.69
7	IY-303	Vengurla	3.3	30	2.88
8	IY-255	Vengurla	2.7	25	3.15
9	IY-320	Vengurla	2.7	24.2	3.03
10	M 44/3 (VRI-2)	Vridhachalam	2.42	21.2	3.36
11	M 15/4	Vridhachalam	2.63	24.3	3.29
12	No. 107/3 (NRCC-1)	NRCC	3	30.7	3
13	No. 40/1 (NRCC-2)	NRCC	2.3	24	3.63
14	Dhana	Madakkal hara	2.8	28.7	2.94
	SEm		0.22	0.03	0.31
	CD		NS	NS	NS

Gen-4 Hybridisation and selection

Principal Investigator : Dr. M. Abdul Salam, Associate Professor

As per the recommendations of the National Group discussions of cashew workers held at CPCRI, Kasargod from 30th August to September 1991, the following cross combinations were identified for further hybridisation.

1. BLA-139-1 x Vetore-56
2. BLA-139-1 x VTII-711
3. BLA-139-1 x Kankadi Types

The aim was to develop a variety with earliness in flowering, bold nuts and less vigorous type by combining BLA-139-1 and boldnut types to get a variety with cluster bearing habit and bold nut along with high yield.

The programme was started after the establishment of male parents. However, Hybridisation was started during January 1993 with available materials. The crosses done during 93-94, 94-95 and 95-96 are given in tables 6A, 6B and 7. The lay out plans are also given.

During 1993-94, 27 seedlings were obtained from different cross combinations and planted in the field.

During 1994-95, 56 seedlings were obtained from different cross combinations and planted in the field.

During 1995-96, 93 seedlings were obtained from different cross combinations and planted in the field.

In total there are 176 hybrid plants in the field planted during 93-95.

During 1995-96 the hybridisation process was continued. The details are furnished in Table 7. 30 seeds were obtained and they will be planted during this year.

Growth characters (height, girth and canopy spread) of hybrids planted during 93-94 and 94-95 were recorded. The yield data of hybrids planted during 93 is also recorded. Since the harvesting is not completed the data is not presented.

Table 6A Details of Hybridisation (1993-94)

Sl. No	Female parent	Male parent	No. of flowers pollinated	Initial set Recorded	fruits harvested 31.03.93	% of Fruits harvested	Nuts sown	Nuts germinated	% Germination
1	BLA-139/1 x P-3-2		23	20	15	65	15	9	60
2	BLA-39/4 x P-3-2		85	30	17	20	17	16	94
3	V5 x II-1591		19	7	3	16	3	2	67

Table 6 B Details of Hybridisation (1994-95)

No	Female Parent	Male Parent	No. of flowers Pollinated	Initial set recorded	Fruits harvested	% of fruits harvested	Nuts Sown	Nuts germinated	% of germination
1	BLA-139-1	P-3-2	293	150	59	39	-	-	-
2	BLA-39-4	P-3-2	563	400	102	26	-	-	-
3	V5	H-1591	200	125	30	24	-	-	-

Hybrids planted on 11.7.95

Hybrid serial number 84-91 = V-5 x H-1591

Hybrid serial number 92-102 = BLA-39-4 x P-3-2

Hybrid serial number 111-132 = BLA-139-1 x P-3-2

Hybrid serial number 133-176 = BLA-39-4 x P-3-2

Hybridisation during 1995-96

Table 7 Details of Hybridisation (1995-96)

No	Female Parent	Male Parent	No. of flowers Pollinated	Initial set recorded	Fruits harvested	% of fruits harvested	Nuts Sown	Nuts germinated	% of germination
1	BLA-139-1	Velore-56	290		22		-	-	-
2	BLA-39-4	VTH-711	173		8		-	-	-
3	T.No. 2236	T.No.2286	258	Nil	Nil		-	-	-

The seeds were harvested. Seedlings will be raised and planted soon.

HYBRIDISATION

LAYOUT PLAN - (sl.no. 1-56: planted during 1993, sl.no. 57-83 planted during 1994)

								H-79	H-80	H-81	H-65	H-66
							E-75	H-76	E-77	H-78	H-64	H-67
							E-55	H-56	E-82	H-83	H-63	H-68
							E-54	H-53	H-52	H-51	H-62	H-69
H-41	H-42	H-43	H-44	H-45	H-46	H-47	H-48	H-49	H-50	H-61	H-70	
H-40	H-39	H-38	H-37	H-36	H-35	H-34	H-33	H-32	H-31	H-60	H-71	
H-21	H-22	H-23	H-24	H-25	H-26	H-27	H-28	H-29	H-30	H-59	H-72	
H-20	H-19	H-18	H-17	H-16	H-15	H-14	H-13	H-12	H-11	H-58	H-73	
H-1	H-2	H-3	H-4	H-5	H-6	H-7	H-8	H-9	H-10	H-57	H-74	

Hybrid serial number 1-11 = BLA-139-1 x P-3-2
 Hybrid serial number 12-28 = BLA-39-4 x P-3-2
 Hybrid serial number 29-56 = V-5 x H-1591

Hybrid serial number 57-65 = BLA-139-1 x P-3-2
 Hybrid serial number 66-81 = BLA-39-4 x P-3-2
 Hybrid serial number 82-83 = V-5 x H-1591

HYBRIDISATION

LAYOUT PLAN (SL.NO. 84-176: 1995 PLANTING)

111	112	113	114		116			117	118		120	121	
134	133	132	131	130	129	128	127	126	125	124	123	122	
135	136	137	138	139	140	141	142	143	144	145	146	147	
160	159	158	157	156	155	154	153	152	151	150	149	148	
161	162	163	164	165	166	167	168	169	170	171	172	173	
										176	175	174	

74	35	86	87	88	89	90	91	92	
101	100	99	98	97	96	95	94	93	
102	103	104	105	106	107	108	109	110	

Hybrid serial number

84-91 = JS x H 1592

Hybrid serial number

92-102 = MDK-1 x P-3-2

Hybrid serial number

111-132 = AKM-1 x P-3-1

Hybrid serial number

133-176 = MDK-1 x P-3-2

AGROTECHNIQUE

A. HORTICULTURE

PROPAGATION AND ROOT STOCK STUDIES

Hort.2 Screening of cashew root stock at nursery stage for the use as dwarfing root stock.

Principal Investigator : Smt. B. Suma (01.04.94 to Continuing)

: Dr. M. Abdul Salam (01.2.95 to continuing)

The objective of the experiment is to identify root stock at nursery stage for the use as dwarfing root stock. Seeds collected from 10 less vigorous types and 5 vigorous types were utilised for the study.

Growth characters of less vigorous dwarf cashew types in the field

Variety/ Types		Height (m)	Girth (cm)	Spread (m)		branches
				E.W	N.S	
1. Tree No.2286	1	2.7	50	3.7	5.2	2
	2	2.8	45	4.9	5.3	3
2. Kariyarappatta	1	4.4	60	3.8	4.5	5
	2	3.5	50	4.5	6	4

Root stock studies

The variety Kariyarappatta and the seedlings raised from Tree No. 2286 were similar in appearance. Now the trees are in yielding stage. Biometric observations like height, girth, spread and number of branches were recorded during this season. 25 seeds from Kariyarappatta and 20 seeds from tree No. 2286 were collected. The seeds have been sown for raising root stock for grafting with the scions of the same mother trees as well as vigorous trees to evaluate their growth performance under field condition.

Inbreeding

Inbreeding programme resorting to selfing of the identified dwarf trees i.e. Kariyarappatta and tree No. 2286 were also taken up. 250 number of pollination were attempted. Unfortunately no seed sets could be noticed. The same programme will be continued in the next season.

New Brazil Collection

The observations recorded from the seedlings planted in the field are recorded and presented in Table 8

Table 8 Growth characters of plants (New Brazil Collection) during 1996.

Sl. No.	Height (m)	Girth (cm)	Spread		No. of Pr. Branches
			E.W.	N.S.	
B1 (dried)	-	-	-	-	
B2	3.3	40	2.8	2.9	2
B3	3.5	30	3.5	3.2	2
B4	5.5	40	1	3.4	..
B5	3.3	30	4	3.4	2
B6	4.5	35	3.7	3.9	2
B7	4.5	35	3.9	4	2
B8 (dried)	-	-	..	..	..
B9	2	20	1	1	4
B10	4.6	20	4.1	2.9	2
B11	4.5	30	2.9	3.1	2
B12	3.4	25	1	1.9	7
B13	2.5	15	1.1	1.6	..
B14	2.8	20	2.3	1.5	2
B15	3.5	30	2.3	2.5	3
B16	4.5	30	2.4	2.3	..
B17	2.8	25	2.5	2.6	3
B18	3.7	25	3.5	3.2	2
B19	2.4	10	1.3	1.6	..
B20	1.1	5	1.2	1.2	..

Date of planting (seedlings)

: August 1993

No dwarf plants could be identified from the Brazil collection based on the growth characters recorded so far.

Part 3 A. Top working trial in cashew

Principal Investigator : Smt. B. Suma (1.04.1994 onwards)

Associate : Dr. M. Abdul Salam (from 1.02.1995)

The XIIth Biennial Workshop on AICRP on cashew held at Kasaragode from 14th-16th October, 1995 recommended that the trial may be concluded.

As such the conclusion report for the project is furnished below.

The experiment was started as an observational trial during 1988 to find out the possibility of rejuvenating unproductive cashew trees by top working with high yielding clones. The treatments are given below

- Age group of trees : a) Between 5-10 years
b) Between 10-15 years
- Height of beheading : a) 0.5 m above ground level
b) 1.0 m above ground level
- Season of grafting : a) Grafting during April- June
b) Grafting during September - October
- No. of trees per treatment : 5
Total No. of trees for the study : 40

Selected healthy trees were cut down at two different heights viz. 0.5 m and 1.0 m during March. Sprout emergence was noticed one month after beheading. Retaining fifteen to twenty healthy sprouts, the rest were removed. The grafting started one month after sprout emergence and the details along with the success are furnished in Table 9 A . (The data of two different heights are pooled and presented.

The highest success was obtained during April (80%) in age group 10-15 years followed by June (77.08%). In trees with age group 5-10 years, grafting during June was found to be better (76%) followed by the grafting during May (59.32%).

Retaining 2-5 Nos of successful grafts on each tree, the others were removed. The growth measurements recorded at monthly interval from 2nd month after grafting are presented in Table 9 B . The growth was more when grafted during April in age group 5-10 years (246.26 cms) and in age group 10-15 years it was with May grafting, (273.3cms), one year after grafting.

Table 9A. Success percentage of soft wood grafting on 'Top worked' trees

Age of trees	Month of beheading	Month of first grafting	No. of trees	No. of shoots grafted	No. of successful grafts	Percent success	Total rainfall (cm)	No. of rainy days	Temperature		
									Mean Max	Mean Min	Mean Rel. hum.
5-10 years		April	2	40	8	20	145.4	9	35.1	24.3	70
		May	5	69	35	59.32	242.6	6	33.7	25.4	76
		June	2	25	19	76	632.1	25	30.0	23.2	83
10-15 years		April	5	100	80	80					
		June	4	48	37	77.08					

In age group 5-10 years only 9 trees were beheaded because one tree out of 10 Nos selected. Completely dried and removed due to stem borer attack
 In age group 10-15 years one tree failed to produce any sprouts and grafting could not be done.

Table 9 B. GROWTH (cm) OF SOFT WOOD GRAFTS ON SUCCESSFULLY TOP WORKED TREES

Age group	Month of	Month after grafting											
		2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th
5-10 years	April	26.3	46.95	68.25	90	118	140	175	193	211	228	246.26	261
	June	22.40	40.40	61.65	82.43	108.5	119.50	129	146	162.3	178.2	196	
10-15 years	April	23.46	45.82	73.68	95	116	152	178.8	207.6	227.6	249.3	273.3	306.6
	June	30.3	56.5	80.25	99	118.5	131	137.5	168.5	187.5	205.5	228	

During 2nd season the trial was taken up on a 9 Nos of trees only of age group 5-10 years. Trees were beheaded at 1 m height during November first week. Only 5 trees produced sprouts and 4 trees failed to produce any sprout. Grafting was done during November 3rd week on physiologically matured sprouts. The scions started to sprout 23 days after grafting and completed within 7 days.

Total No. of grafts done	: 55
No. of successful grafts	: 42
Percent of success	: 76

Number of grafts retained on each tree was limited to 5.

During March 1989 2 Nos of trees (out of 5 trees grafted) died due to stem borer attack. The growth measurements of the successful grafts were recorded at monthly interval from 2 months (January 1989) after grafting onwards. The average growth recorded 7th month after grafting (June 1989) is 150.5 cms.

Initially there are 9 top worked trees. There was gradual reduction in numbers of trees due to death caused by severe attack of stem borer. The tree numbers decreased from 9 to 4 within a period of six years. There was steady improvement in terms of growth characters (girth and spread). The tree start yielding from 2nd year onwards. During 4th year on an average the per tree yield was 4 kg. Thereafter there was a decline in yield. Stem borer incident was the major problem observed. Although there was precocity, the yield level observed was not substantial. From the results it can be concluded that, the technology is technically feasible but not economically viable. The details are furnished in Table No. 10 A.

B. Large plot trial on top working

A large plot trial on top working consisting of 53 trees were taken up during 1991. Only 11 plants are survived and others died due to stem borer attack.

Growth parameters like height, girth, spread, no. of primary branches, no. of panicles/m², no. of nuts per panicle and yield were recorded. Data for the last three years are furnished in Table No. 10 B.

The survival percentage of the top worked trees is only 20% and as such the technology is not economically viable.

Table. 10 A Growth and yield of top worked trees over years

Characters	89-90 (mean 9 trees)	90-91 (mean 9 trees)	91-92 (mean 6 trees)	92-93 (mean 6 trees)	93-94 (mean 6 trees)	94-95 (mean 4 trees)	Grand mean
Girth (cms)	20.7	25	22.5	30.4	51.3	118.8	44.5
Spread (ms)	3.5	4	7.1	7.4	6.8	7.9	6.1
No. of pri.br.	9	10	4.3	4.3	4.3	4	6
No. of pan m2	8.6	10	7.3	7.3	7.5	6.5	8.8
No. of sus particle	7.2	7.7	6.8	6.8	6.2	7	7.3
Yield in kg	0.92	1.2	2	4	1.7	2.4	2.2

Table 10 B Large plot trial on top working- Growth and yield parameters over years

Characters	92-93 (mean 19 trees)	93-94 (mean 11 trees)	94-95 (mean 11 trees)	Grand mean
Height (ms)	.	35	42	39
Girth (cms)	7.9	31.1	112.7	50.5
Spread (m)	0.34	3.5	4.5	3
No. of pr.br.	2.9	3.2	3	3
No panum2	3.5	2.9	5.4	3.9
No nut pani.	3.5	2.9	5.4	4
Yield (kg)	1	2.1	1.1	1.6

Conclusion

Top working is a rejuvenation technique which is technically feasible. Since the death of trees due to stem borer is severe, it is not economically viable. However, precocity is an advantage. The technique involves intensive care and management during early period. As such it is very difficult to follow the same on large scale under farmers' period.

B. AGRONOMY

AGR 1 NPK fertiliser experiment

Principal Investigator : Dr. M. Abdul Salam, Associate Professor

Objective

To find out fertilizer requirement for cashew grafts

As per the decisions in the National Group Discussion of Cashew Research workers held at CPCRI, Kasargod during August 30th to September 1st, 1991. The experiment was laid out in Sept 1992 with the following treatments.

Levels of N	: 0,500,1000 g/plant/year
Levels of P ₂ O ₅	: 0,125,250 g/plant/year
Levels of K ₂ O	: 0,125,250 g/plant/year
Treatment combinations	: 27
Design	: factorial RBD
Replication	: 2
Planting material	: Softwood grafts of Madakkathara-1 (BLA-39-4)
Spacing	: 8m x 8m
No. of plants per plot	: 4
Date of planting	: 25.09.92

Fertiliser application was done as per the technical programme during Sept 1994.

There was severe infestation of tea mosquito in the NPK experimental plot despite application of insecticides as per recommended schedule. The yield was negligible and hence not recorded individual tree wise.

Observations on plant height and girth were taken during the period (Table 11)

The data could not be analysed statistically due to technical reasons.

Table 11 Height and girth of plant under different treatment of NPK

Treatment	Height(m)	Girth(cm)	Canopy spread
NoPoKo	2.73	36	3.25
NoPoK1	2.52	32.5	3.5
NoPoK2	2.8	40	3.6
N1PoKo	2.79	32	3.25
N1PoK1	2.97	28	3.35
N1PoK2	2.94	33	3.15
N2PoKo	2.6	30	3
N2PoK1	2.86	32	3.5
N2PoK2	3	35.5	3.7
NoP1Ko	2.53	27	2.65
NoP1K1	2.61	28.5	3.05
NoP1K2	2.39	28.5	2.8
N1P1Ko	2.61	30	3.05
N1P1K1	2.85	34.5	2.95
N1P1K2	2.96	34	3.25
N2P1Ko	2.8	37	3.45
N2P1K1	2.94	32	3.35
N2P1K2	2.75	29.5	2.85
N0P2Ko	2.98	32.5	2.75
N0P2K1	3.15	37.5	3.05
N0P2K2	3.08	35	3.4
N1P2Ko	3.31	34.5	3.5
N1P2K1	2.55	27.5	2.95
N1P2K2	2.87	32.5	3.4
N2P2Ko	2.52	24	2.9
N2P2K1	2.44	25.5	2.65
N2P2K2	2.5	25.5	3.25

CROP PROTECTION

ENTJ Chemical control of pest complex in cashew

- i. Control of major pests- Tea mosquito
- ii. Control of minor pests
- iii. Control of foliage/inflorescence pest with neem products- This part will be taken up during 96-97 period.

Principal Investigator : Dr. Susannamma Kurian (from 04-04-95 onwards)

The objective of the experiment is to find out an alternate spray schedule for the management of tea mosquito by reducing the number of sprays and to identify the most critical spray(s).

Year of start : November 1991

Technical programme

- T1- Monocrotophos(0.05%) one spray at flushing stage
- T2- Endosulfan (0.05%) one spray at flowering stage
- T3- Carbaryl (0.10%) one spray at fruiting stage
- T4- T1 and T2
- T5- T1,T2 and T3
- T6- T1 and T3
- T7- T2 and T3
- T8- Endosulfan 0.05% spray at flowering followed by Neem oil at fruiting stage.
- T9- 0.1 % spray at flowering followed by Neem oil at fruiting stage
- T10- Control

Design	: RBD
No. of trees per treatment	: Two
No. of replications	: Three

Two trees in each treatment were separated from the adjoining set of treatments by one set of guard trees all around. The guard trees were also sprayed (half portion of the canopy facing the treated trees) with the same insecticides of the respective treatments.

Progress of work 1995-96

First spraying was not given during flushing. The second and third sprays were given with Endosulfan (0.05%) and carbaryl (0.10%) at the time of panicle emergence and fruit set stages during the months of December 1995 and January 1996 respectively as per the technical programme. Observations on the incidence of tea mosquito, other

minor pests viz. leaf minor, leaf roller, blossom weber, natural enemies and beneficial insects were recorded one day before spraying and one month after each spray. All the species of ants and spiders present at the time of observation was counted in each quadrant. In the case of the predators, chrysopa and mirid bugs, four panicles from the four different sides were inserted in polythene bags, brought to the laboratory and counted the immature stages and adults and represented as mean number per panicle.

Results 1995-96

Tea mosquito infestation (mean percentage) recorded in the treated and untreated plots is presented in Table 12 and the mean score values is presented in Table 13. The population of minor pests viz. leaf miner, leaf roller, blossom weber and flower thrips is assessed in the treated and untreated and presented in Table 14. The variations in the natural enemy population in treated and untreated plots were recorded and presented in Table 15. The yield for 1994-95 is also presented in Table 12.

ENT II

Control of stem and root borer -Prophylactic treatments

Principal investigator : Dr.Susannamma Kurian (from 04-04-95)

This experiment was started during November 1991. The objective of this experiment is to assess the effectiveness of neem products, sevidol and kaolin clay applied on the tree trunk and exposed roots for preventing the infestation by stem and root borer in cashew.

Technical Programme

- T1 - Neem oil 5%
- T2 - Neem seed kernel extract 5%
- T3 - Kaoline paste + arpos
- T4 - Neem Cake extract 5%
- T5 - Sevidol
- T6 - Untreated control
- T7 - Neem cake @ 3 Kg
- T8 - Neem oil 5% swabbing on tree trunk and sevidol 75 g per tree basin.

No. of trees/treatment : 25

Table 12 Tea mosquito infestation in experiment plots 1995-96 (Mean of three replication)

Treatments	Pre treatment count		After 11 spray		After 111 spray		Yield kg/ tree
	Shoot %	Panicle %	Panicle %	Nut %	Panicle %	Nut %	
T1 Monocrotophos	Skipped the spray						
T2 Endosulfan 0.05% as 2nd spray	48.02	10.6	72.22	42.87	53.85	29.6	2.2
T3 Carbaryl 0.10% as 3rd spray	56.74	20.4	55.88	52.77	67.86	41.18	3.29
T4 T1 & T2	43.55	12.35	70.96	82.77	52.94	37.5	4.2
T5 T1, T2 & T3	62.92	10.14	66.67	77.42	72.97	39.13	3.17
T6 T1 & T3	33.03	18.75	85	73.33	72.22	55.17	7.8
T7 T2 & T3	44.89	43	50	51.43	60.71	36.36	6.11
T8 Endosulfan + Neem oil	45.13	12.35	45.16	63.88	37.85	27.5	4.8
T9 Carbaryl + neem oil	56.72	8.94	48.15	48.28	55.17	39.29	2.79
T10 Control	44.87	10.14	96.67	77.97	95.45	73.53	3.7

Table 13 Tea mosquito infestation in experiment plots (mean score)
Mean of three replications

Treatments	After II spray		After III spray	
	Panicle	Nut	Panicle	Nut
T1	..	..	..	..
T2	2.76	0.23	1.92	1.27
T3	1.73	0.32	0.74	2.1
T4	2.65	0.31	2.26	1.04
T5	1.74	0.27	2.26	1.04
T6	1.58	0.76	1.51	0.96
T7	1.42	0.45	2.26	1.35
T8	1.51	0.77	1.79	0.90
T9	1.43	0.37	1.63	1.47
T10	2.42	1.86	2.52	1.57

Table 14 Occurrence of minor pests in experiment plots 1993-94

Treatments	Pre-count			After 2 spray			After 3 spray	
	Shoot infestation%	Leaves infested%	Leaf roller	Blossom webber %	Thrips mean no.	Mean score	Thrips mean number	Mean score
T1	Skipped the first spray							
T2	2.13	5.67	2.57	2.77	5.13	0.71	3.52	0.26
T3	1.96	6.71	1.75	7.37	3.5	0.46	3.25	0.13
T4	1.24	10	2.35	2	11.53	0.58	4.1	0.12
T5	1.32	13.33	3.28	0.83	4.44	0.25	5	0.16
T6	2.9	7.21	3.55	2.83	11.2	0.5	4.13	0.18
T7	4.67	10.67	3.57	1.83	3.28	0.28	8.75	0.36
T8	1.23	7.83	2.57	2.67	7.83	0.8	10.33	0.26
T9	1.32	12.51	4.57	3.67	3.72	0.45	4.75	0.18
T10	1.93	13.47	5.57	2.5	12.51	0.7	11.43	0.25

Table 15 Occurrence of natural enemies (mean number per quadrant.)

Treat- ments	Pre- count		After 2 spray				After 3 spray			
	Ants	Spiders	Ants	Spiders	Minute beetles	Chrysopa	Ants	Spiders	Minute beetles	Chrysopa
T1	Skipped the first spray									
T2	1	0.75	..	..	1	..	0.75	0.75	..	..
T3	1.25	0.5	0.5	..	1.1	..	1.2	..	..	..
T4	1.5	1	..	..	1.3	..	2.3	..	..	..
T5	1.33	1.75	..	0.25	..	..	0.75	..	..	..
T6	0.5	0.5	0.7	..	..	..	1	1.2	..	1
T7	0.7	1.25	1.25	1.5	0.7	..	0.8	..	0.9	..
T8	1.5	1	0.15	1	1.1	..	2.3	0.5	1	..
T9	1.5	1.5	..	1.2	1.2	..	2	..	..	..
T10	1.5	1.25	0.8	..	1.2	..	1.5	0.75	..	1

Suggested modified treatments as per the proceedings of XIIth Biennial workshop of 14-16th October 1995 held at CPCRI Kasargode.

- T1- Mudslurry swabbing
- T2- Sevidol 4G soil application + swabbing of trunk with Carbaryl 0.2%.
- T3-Neem oil 5%
- T4-Neem cake extract 5%
- T5-Neem seed kernel extract 5%
- T6-Control

Eighteen year old trees of the old CYT (seedlings) area was selected and eight blocks were demarcated. The area under each block consisted of about 50-60 trees. Twenty five healthy and uninfected trees were selected for the treatment in each block and experiment trees were selected in such a way that a minimum of five trees and maximum ten trees already affected by stem and root borer were present in the plot, which may serve as the source of infestation. Each treatment block was separated from the other by atleast two rows of trees around. Before the application of treatments the tree trunk upto one metre height and the exposed roots were cleared by using a coir brush to dislodge the termite galleries, stem borer eggs and grubs if any.

Treatments were applied during April-May 95 as per the above mentioned treatments. Suggested modified treatments were given during November-December. First round of application was given during May 1995. The second application was given during last week of November 1995. Observations were recorded at monthly intervals and noted the oviposition, presence of grubs etc. on treated and untreated trees in each block. The number of trees infested at every month after each application of treatments is presented in Table 16 and summarised in Table 17.

Results

Stem borer infestation could be noticed in almost all the treatments during June to November period and the infestation was maximum in the untreated control. After that the infestation was cleared and again treatments were applied.

During the second half (December-May) it was found that Neem oil application 5 per cent on collar portion upto 1 m height and on exposed roots and stem prevents the Stem and Root Borer attack for three months.

Table 16 cont.

1	2	3	4	5	6	7	8	9	10	11	12	13	
MAY 1995													
11	25	-	..	-	-	-	..	-	..	..	..	..
12	25	-	..	-	-	-	..	-	..	..	..	..
13	25	-	..	-	-	-	..	-	..	..	..	..
14	25	-	..	-	-	-	..	-	..	..	..	..
15	25	-	..	-	-	-	..	-	..	..	..	..
16	25	-	4	16	-	-	4	16	..	..	..	..
17	25	-	2	8	2	8	..	-	..	..	..	..
18	25	-	..	-	..	-	..	-	..	..	..	..
Applied the Dreat.						-	..	-	..	..	..	..
June 1995													
01	25	-	3	12	-	-	3	12	..	..	..	-
02	25	-	3	12	-	-	2	8	1	4	-	-	
03	25	-	-	-	..	-	-	-	..	..	-	-
04	25	-	-	-	-	-	-	-	..	..	-	-
05	25	-	-	-	-	-	-	-	..	..	-	-
06	25	-	4	16	4	16	..	-	..	..	..	-
07	25	-	..	-	-	-	..	-	..	..	-	-
08	25	-	-	-	-	-	..	-	..	..	..	-

Table 16 cont.

1	2	3	4	5	6	7	8	9	10	11	12	13
JULY 95												
T1	25		..	-	-	-	..	-	..	..	..	-
T2	25		2	8	2	8	..	-	..	..	..	..
T3	25		1	4	1	4	..	-	..	..	..	..
T4	25		2	8	-	-	2	8	..	..	..	-
T5	25		1	4	1	4	..	-	..	..	..	..
T6	25		5	20	2	8	3	12	..	..	..	..
T7	25		..	-	-	-	..	-	..	..	..	..
T8	25											
AUG 95												
T1	25		-	-	-	-	..	-	..	..	-	..
T2	25		-	-	-	-	..	-	..	-	..	..
T3	25		3	12	3	12	..	-	..	..	-	..
T4	25		4	16	2	8	2	8	..	..	..	..
T5	25		1	4	1	4	-	-	..	..	..	..
T6	25		7	28	4	16	2	8	1	4	..	-
T7	25		-	-	-	-	..	-	..	-	-	-
T8	25		..	-	-	-	..	-	..	..	..	-

Table 16 (contd.)

1	2	3	4	5	6	7	8	9	10	11	12	13
September 1995												
T1	25	-	-	-	-	-	-	-	-	-	-	-
T2	25	-	2	8	2	8	-	-	-	-	-	-
T3	25	-	2	8	-	-	2	8	-	-	-	-
T4	25	-	3	12	-	-	3	12	-	-	-	-
T5	25	-	-	-	-	-	-	-	-	-	-	-
T6	25	-	5	20	2	8	1	4	2	8	-	-
T7	25	-	2	8	-	-	2	8	-	-	-	-
T8	25	-	2	8	-	-	2	8	-	-	-	-
Oct. 95												
T1	25	-	1	4	-	-	-	-	1	4	-	-
T2	25	-	2	8	-	-	2	8	-	-	-	-
T3	25	-	3	12	-	-	3	12	-	-	-	-
T4	25	-	2	8	-	-	2	8	-	-	-	-
T5	25	-	-	-	-	-	-	-	-	-	-	-
T6	25	-	6	24	2	8	4	16	-	-	-	-
T7	25	-	2	8	-	-	2	8	-	-	-	-
T8	25	-	2	8	2	8	-	-	-	-	-	-

Table 16(contd.)

1	2	3	4	5	6	7	8	9	10	11	12	13
November 1995												
T1	25	-	2	8	2	8	-	..	..	-	..	-
T2	25	-	2	8	2	8	-	..	..	-	..	-
T3	25	-	3	12	3	12	-	..	..	-	..	-
T4	25	-	2	8	2	8	-	..	..	-	..	-
T5	25	-	4	16	4	16	-	..	..	-	..	-
T6	25	-	5	20	3	12	2	8	..	-	..	-
T7	25	-	1	4	1	4	-	..	-	-	..	-
T8	25	-	2	8	2	8	-	..	..	-	..	-
Appn.of treat.												
December 1995												
T1	25	-	-	-	..	-	-	-	-	-	..	-
T2	25	-	-	-	..	-	-	..	..	-	..	-
T3	25	-	-	-	..	-	-	-	-	-	..	-
T4	25	-	-	-	..	-	-	..	-	-	..	-
T5	25	-	3	12	..	-	3	12	-	-	-	-
T6	25	-	7	28	2	8	4	16	1	4	..	-

Table 16 (contd.)

1	2	3	4	5	6	7	8	9	10	11	12	13
January 1996												
T1	25	-	-	-	..	-	-	..	-	-	..	-
T2	25	-	-	-	..	-	-	..	-	-	..	-
T3	25	-	-	-	..	-	-	..	-	-	..	-
T4	25	1	1	4	1	4	-	..	-	-	..	-
T5	25	-	3	12	3	12	-	..	-	-	..	-
T6	25	-	7	23	2	8	5	20	-	-	..	-
Feb. 1996												
T1	25	-	1	4	1	4	-	..	-	-	..	-
T2	25	-	3	12	3	12	-	..	-	-	..	-
T3	25	-	-	-	..	-	-	-	-	-	..	-
T4	25	-	1	1	4	1	4	..	-	-	..	-
T5	25	-	4	3	12	3	12	..	-	-	-	-
T6	25	-	2	6	24	5	20	1	4	-	-	-

Table 16 (contd.)

1	2	3	4	5	6	7	8	9	10	11	12	13
Mar. 1996												
T1	25	-	3	12	1	4	2	8	-	..	..	-
T2	25	-	2	8	2	8	-	-	-	-	..	-
T3	25	-	2	8	2	8	-	-	-	-	..	-
T4	25	-	2	8	1	4	1	4	-	-	..	-
T5	25	2	3	12	1	4	2	8	-	..	..	-
T6	25	-	6	24	2	8	4	16	-	-	..	-

Table 17 Stem and root borer infestation as influenced by prophylactic treatments (1995-96) summarised out of 25 trees

Treatments	Number of trees infested after the application of treatments													
	1993											1994		
	Apr.	May		June	July	Aug.	Sept.	Oct.	Nov.		Dec.	Jan.	Feb.	Mar.
T1-Neem oil 5%	-	1		-	-	-	..	1	2		-	..	..	1
T2-Neem seed kernel extract 5%	-	..		3	-	-	2	2	2		..	..	..	2
T3-Kaolin + Arpcos	-	-	Tr. appli- cation	3	1	-	2	3	3	Tr. appln.	..	..	..	2
T4-Neem cake extract 5%	1	..		2	2	4	3	2	2		..	1	1	2
T5-Sevidol 4G 50g	1	..		1	1	1	..	-	2		..	-	..	2
T6-Untreated control	5	4		4	5	7	5	6	5		7	5	3	6
		Cleared the infestation								Cleared the infestation				
T7-Neem cake @3kg	-	2	..	-	-	-	2	2	1					
T8-Neem oil 5% swabbing on tree trunk with Sevidol 75 g/tree		-		-	-	-	..	2	2					

Ent. III Bio-ecology of pests and survey of pest complex and their natural enemies

Objectives:

To study the occurrence of different pests of regional importance on cashew in relation to climatic factors or the seasonal abundance and also to study the extent of parasitisation on major pests.

Technical programme in brief including observations

The extent of pest infestation and their seasonal abundance has to be reported for all the major pest. Data is to be collected from a minimum of 12 individual trees which are not sprayed with any insecticides throughout the year. Fortnightly/monthly observations have to be recorded in the proforma Nos I to IV (vide proceedings of the XI Biennial Workshop of AICCIP held at UAS Hebbal, 18-20 August, 1993). The extent of parasitisation should be studied at fortnightly/monthly intervals by observing atleast 50 host insects. Survey was conducted in the private plantations also and recorded the intensity of infestation by tea mosquito, minor pests and natural enemies.

Results

Tea mosquito infestation on shoots ranged from 0.02 to 9.86 per cent during April to December period. But no infestation could be noticed on panicle and nuts during the same period. Tea mosquito infestation was maximum on panicle and nuts during January and February 1996 Table 18.

Leaf miner infestation on leaves and thrips on nuts was maximum during December to March period Table 19 .

The natural enemies and other agents noticed in the un sprayed area was ants, spiders, mirid bugs, chrysopa, honey bees, flies and wasps (Table 20)

Table 18 Monthly occurrence of Tea mosquito

Months	Shoots		Panicle		Nuts	
	%	Mean score	%	Mean score	%	Mean score
1995						
April	No fresh infestation		2	0.1	..	..
May	..	..	..	..	..	..
June	2.27	0.33	..	..	..	..
July	2.09	0.12	..	..	..	..
August	..	..	..	..	..	..
Sept.	..	..	..	..	..	..
October	..	..	..	..	..	..
Nov.	3.4	0.02	..	..	..	..
Dec.	9.86	0.3	9.68	0.26	..	..
1996						
January	..	..	42.65	1.25	5.75	0.15
Feb.	..	..	34.03	2.4	5	0.07
March	..	..	..	..	4.75	0.04

Table 19 Seasonal occurrence of minor pests (Mean of 12 observations)

Months	Leaf minor				Thrips		
	Shoots %	Leaves %	Leaf roller	Blossom webber %	% nuts affected	Mean score	Apple and nut borer
1995							
April	..	..	..	..	6.58	0.23	1.02
May	..	..	..	..	..	..	..
June	..	..	..	..	..	..	..
July	..	..	..	..	..	..	..
August	..	...	..	..	..	..	..
September	..	..	2.2	..	..	..	-
October	..	6.93	4.56	..	..	..	-
November	4.47	12.16	..	7.63	..	..	..
December	7.24	18.17	5.6	8.33	..	..	..
1996							
January	..	13.1	..	5.31	4.63	0.28	..
February	0.75	12	..	..	4.7	0.14	3.83
March	..	..	..	..	19.82	0.6	..

Table 20 Seasonal occurrence of natural enemies and other agents

Months	Ants	Spiders	Mirid bugs	Chrysopa	Honey bees, flies and wasps
1995					
April	0.45	0.31	..	..	1.13
May	0.62	0.59	..	..	..
June	0.29	0.44	..	..	..
July	..	..	..	..	..
August	0.23	0.29	..	..	..
September	0.52	0.44	..	..	..
October	1.04	1.13	..	..	0.42
November	1.02	1.31	..	..	..
December	1.27	2.51	0.37	..	0.56
1996					
January	1.58	3	1.81	..	3.5
February	0.83	0.5	..	..	..
March	1.06	0.83	..	..	..

Survey Report

1. Date	:	1.11.95	1.11.95	4.12.95
2. Location (Village/Taluk/Dist.)	:	Pattikkad Thrissur,	Pattambi Thrissur	Nehru Nagar Thrissur
3. No. of field/plot & address of farmer	:	1 P.O. Antony Padikkalath House	1 George Kuruvilla Mangode Estate Njangyatri	1 P.J. Sebastain Nehru Nagar
4. Total No. of trees in orchard	:	140	180	190
5. No. of borer infest- ed trees	:	Nil	Nil	Nil
a. Age of the tree	:	3 years	6-7 year old	7-8 years
b. Nature of the trunk	:	Soft & smooth	soft & smooth	soft & smooth
6. Status of foliage pest	:	Leaf miner	Leaf thrips Leaf miner	Leaf miner
a. Common name of the pest	:	Achrocercopes syngamma	Achrocercopes syngamma	Achrocercopes syngamma
b. Scientific Name	:			
c. Month of occurrence	:	Oct-Nov period	Aug-Dec	Aug-Dec
d. Intensity	:	Moderate	Moderate	Moderate
e. Natural enemies	:	-----	Honey bees	Honey bees
7. Tea mosquito attack	:	Yes	Yes	Yes
a. Month of occurrence	:	Oct-Dec	Oct-Jan	Oct-Jan
b. Intensity	:	Low	High	Moderate
8. Control measures recommended	:		--	--
a. Stem borer	:			
b. Foliage pest	:	Endosulfan/ Monocrotophos/ Carbaryl spray	... do...	..do...
c. Tea mosquito	:			

EntIV Screening of germplasm to locate tolerant /resistant types to major pests of the region

Objectives

To identify the varieties/types which are tolerant/resistant to major pest, tea mosquito.

Technical programme

All the accessions available in the germplasm are to be screened for tea mosquito infestation. In each tree the observations are to be recorded from 0.5 m x 0.5 m area of the canopy on all the four sides at fortnightly/monthly intervals (vide proforma given in the proceedings of XI Biennial Workshop of AICCIP held at UAS, Bangalore 18-20th August 1993).

Progress of work and results

All the accessions planted during 1988 (Acc. Nos. 15 to 50) and 1989 (Acc. Nos. 51-82) were observed for tea mosquito infestation at monthly intervals on regular flushes during 1995-96. The yield data recording was completed during May 1995. Tea mosquito infestation was very high during January- February 1996 Table 21.

Field confinement test

After testing the accessions in the field for natural infestation for the last 3 years the varieties/types considered to be comparatively tolerant/less susceptible are Madakkathara-1, II-3-17, II-718, II-1600, A-26-2, A-6-1, PU-8, K-10-1, II-8-1, II-8-7, II-8-8, II-8-15, Tree No. 856. These varieties were subjected to field confinement test during November-December, 1995.

Muslin cloth cages were fixed on five shoots/panicle and last instar means of the tea mosquito (one nymph/shoot and one nymph/panicle) was introduced into the cages. After 24 hours the nymphs were removed and allowed the muslin cloth cages to remain in position. The reaction to the feeding was noted in 0-4 scale at the time of the removal of nymphs and after 2 days.

Table 21 Tea mosquito infestation and yield on less susceptible accessions

Sl.no.	Accession no.	Varieties/Types	Mean infestation		
			Percentage Oct-April 96	Mean	Yield kg/tree 94-95
1	17	Bzl-120	44.99	0.6	1.45
2	18	Bzl-239	39.11	0.5	1.5
3	22	Bzl-248 (S)	32.34	0.2	1.4
4	25	Vapala	32.55	0.26	2
5	26	BLA-139-1	37.5	0.45	2.75
6	27	BLA-39-4	80.28	1	2.8
7	28	K-22-1	67.82	0.61	1.75
8	30	H-313	71.32	0.72	1.25
9	31	H-3-17	70.29	0.92	1.55
10	32	H-680	77.69	0.86	1.1
11	34	H-718	75.59	0.81	2.65
12	35	H-719	77.23	0.65	1.5
13	37	H-1588	72.15	0.81	1.2
14	38	H-1589	73.31	0.75	2.4
15	41	H-1596	88.46	0.78	1.9
16	42	H-1597	23.33	0.83	2.7
17	43	H-1598	25	0.75	1.25
18	44	H-1600	39.39	0.27	2.2
19	49	A-26-2	69.23	1.92	1.5
20	57	PU-8	45.45	1.36	1.2
21	58	Rajamundry	63.64	1.91	1.25
22	60	Bzl-18	11.76	0.35	1.05
23	75	H-8-1	70	1.67	1.75
24	73	H-3-9	18.67	0.44	1.85
25	81	H-9-3	11.3	0.12	0.9

Table 22.

Mean score of tea mosquito infestation on shoot and panicle in the field confinement studies

Varieties	Mean score	
	Shoot	Panicle
MAD-1	0.5	0.75
A-26-2	0.5	0.25
H-8-7	1	0.5
H-8-8	0.25	....
H-5-1	0.25	1.25
H-1600	1.75	....
H-718	0.5	.....
K-10-1	1	1
H-3-17	0.25	1
PU-8	1.5	0.5
H-8-15	1.25	2.5
A-6	2	3.25
T 856	1.25	1.25

The above data shows that varieties A-26-2, H-8-8, H-718 and H-3-17 are found to be tolerant than the rest of the varieties. Clonal progenies will be tested during the coming season as and when the grafts will be ready.

RESEARCH HIGHLIGHTS

1. A clonal germplasm conservation block with 120 accessions was established.
2. A hybrid II-1591 was released as Priyanka.
3. Eighteen high yielding cashew varieties evolved at six Cashew Research Centres of India are under evaluation at this centre. Of this the varieties M 26/2 and M44/3 of Vridhachalam and V5 from Vengurla are found to be promising for this State of Kerala.
4. Screening of vigorous and less vigorous cashew types revealed that it is possible to identify the less vigorous types in the seedling stage itself using morphological characters, phenolic content in leaves, stomatal index, bark percentage in root etc. as criteria.
5. A total of 176 hybrid seedlings were planted in the field during the period 1993- 96 .
6. Application of neem oil 5 percent on tree trunk and exposed roots is effective in preventing stem borer infestation for 2 months. Sevidol granules @ 50 g/tree, prevented infestation for three months.
7. The accessions, A-26-2, II-718, and II-8-8 and II-3-17 were comparatively tolerant to tea mosquito infestation than the rest of the accessions.

RESEARCH PUBLICATIONS

Book

1. M. Abdul Salam and N. Mohanakumaran. High Yielding Varieties of Cashew. published by Directorate of Cashewnut Development, Cochin. PP. 45

Research articles

1. K.E. Usha, T.N. Jagadeesh Kumar, and Dr. S. Pathummal Beevi "Kanakan and Dhana" Cashew Bulletin 3-6.
2. Suja Eapen, Abdul Salam M. and Wahid P.A. (1995) Root Distribution Pattern of Colocasia-³²P Plant Injictia Technique. J. of Nuclear Research (1995) pp.-98-105.
3. Abdul Salam M., Satheesbabu K., and N. Mohanakumaran. Homegarden Agriculture in Kerala - revisited. Food and Nutrition Bulletin, United Nations University p-220-223.
4. Abdul Salam. M (1996) Plant cashew well (in Malayalam)
5. Abdul Salam M., Pushpalatha P.B., and Suma A. (1995) Root Distribution Pattern of seedling raised cashew tree. Journal of Plantation Crops 23(1) ; 59-61 (June 95)
6. Beena Bhaskar M., Abdul Salam M., and Wahid P.A., 1995 Nutrient offtake in cashew (*Anacardium occidentale* L) The Cashew IX 3. P 9-16.
7. Mini Abraham., and Abdul Salam M. 1995 Canopy analysis in cashew) The Cashew IX (4).

ACTION TAKEN ON THE RECOMMENDATIONS OF XIIth BIENNIAL WORKSHOP OF AICCIP HELD AT CPCRI, KASARGODE (14th-16th OCT. 95)

RECOMMENDATIONS	ACTION TAKEN
<p>Gen.1 Germplasm collection, maintenance and description of types.</p> <p>The experiment is to be continued at this centre. Possibility of getting exotic cashew accessions from Brazil and Australia be looked into (esp. a dwarf type(Guntur 2/11) from Australia).</p>	<p>Action is being taken to get exotic cashew.</p>
<p>Gen.3 Expt.2: Varietal evaluation -MLT with varieties from Vittal, Vridhachalam, Vengurla and Bapatla.</p> <p>The experiment is to be continued.</p> <p>As performance of M-26/2 from Vridhachalam was found to be good, in all MLT, performance of varieties at original source may be obtained and the same be compared with performance at Madakkathara.</p> <p>The possible location effect on yield, nut size and shelling percentage be noted. Data on (MLT 1989) flowering intensity (per unit area), number of fruits per panicle, sex ratio to be collected to propose new varieties from this trial.</p>	<p>Being continued</p> <p>Action is being taken.</p>
<p>Gen.3 Expt.3: MLT-92 with varieties from Bapatla, Vengurla, Vridhachalam and NRC cashew, Puttur.</p> <p>The experiment is to be continued.</p>	<p>Being continued</p>

<p>Gen.4 Hybridisation and Selection. Parents identified for crossing programme are as follows.</p> <ol style="list-style-type: none"> 1. Anakkayam-1 (BLA-139-1) 2. Madakkathara-1 (BLA-39-4) 3. Madakkathara-2 (NDR-2-1) 4. Kanaka (II-1598) 5. Dhana (II-1608) 6. II-3-17 7. II-1600 8. II-3-13 9. II-1610 10. II-856 11. II-1591 12. K-22-1 13. A-26-2 <p>Released varieties with desirable characters, special emphasis on TMB resistant lines, M-10/4 and M-44/5, be given. F1 hybrids be evaluated in multilocational trials. They may be evaluated for yield parameters under supplementary irrigation too. The dwarf lines be selfed and S1 generation is studied for desirable characters.</p> <p>BLA-139-1 x Vetore-56; BLA-139-1 x VTHI-711/4 BLA-139-1 x Kankadi type (from Vengurla)</p> <p>In the 94 hybrids produced so far, the characters for which the parents were selected been scored so as to identify the donor parent with desirable trait and used in future hybridisation programme.</p>	<p>Action is being taken</p>
<p>A. Agronomy</p> <p>Agr.1 NPK fertilizer expt.</p> <p>The experiment is to be continued.</p> <p>In the newly planted NPK experiment, full dose of treatment was to be given in August and after heavy rains. Soil and leaf analysis to be done during the current year.</p>	<p>Being done</p>
<p>Agr.5. Standardisation of index leaf in cashew</p> <p>The scientist- in-charge to send the requisite information to the Director, NRCC regarding "Standardization of index leaf in cashew" experiment.</p>	<p>Already sent</p>

<p>Agr.6. Cashew based cropping system</p> <p>As per the XI Biennial Workshop decision, a high density planting trial (625 plants/hectare), hedge row system of planting with a spacing of 10 m x 5 m be started. The trial be initiated in the additional land made available for this trial (old rubber plantation area). Medicinal plants be finalised in consultation with the AICRP on aromatic and medicinal plants. 16 plants per plot (4 x 4) be allotted for each of the crop so that the middle four cashew plants be assessed for effect of intercropping in main crop.</p> <p>As per the XI Biennial workshop, decision an " On farm trial" with higher doses of nitrogen be taken up .</p>	<p>Sanction is given by the University to the Estate Office to cut 609 rubber trees and to make available the land to CRS. A tender was made but the auction could not be fixed. Action is being taken by the Estate Office to retender the rubber trees.</p> <p>Farmers' field is identified. Will be laid out during this year.</p>
<p>B. Horticulture: Hort.1 Vegetative propagation trial.</p> <p>As per the decision of the XI Biennial workshop 1995 this trial is to be discontinued.</p>	<p>Discontinued</p>
<p>Hort.3 Top working trial in cashew</p> <p>As per the decision of the XI Biennial workshop 1995 this trial is to be discontinued.</p>	<p>Discontinued</p>

<p>Hort.4 Screening of rootstock for dwarfing characters</p> <p>In breeding programme, selfing of identified dwarf trees be tried to select truly dwarf seedlings .</p> <p>To collect seeds of dwarf trees available at Anakkayam.</p> <p>By March 1996 to produce 5000 grafts of the released variety 'Priyanka' for planting in five locations. The centre should also take up planting of "Priyanka" grafts in regular spacing in 1 ha land for demonstrating the potential of the variety in the field.</p> <p>Regarding sale of grafts from the centre the following aspects to be refined for increasing the higher recovery of saleable grafts.</p> <ol style="list-style-type: none"> a. Storage of seed nuts b. Proper maintenance of root stocks for getting higher number of root stocks for grafting. c. Maintenance of grafts after removal from humidity chamber. d. Removal of sprouts on root stock portion in multiple shoots from scion. 	<p>Done. But there was no seed set. It is being maintained in the germplasm (UL 12-2)</p> <p>Being done</p> <p>Action is being taken</p>
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<p>Crop Protection</p> <p>Ent1 Chemical control of pest complex in cashew.</p> <p>Expt.1. Control of major pest- tea mosquito</p> <p>In large plot trial (area 1 ha) skipping the first round (i.e. 2nd and 3rd round only) for spray schedule evaluation be carried out.</p> <p>Nut yield in various treatments be recorded and reported.</p> <p>Data on occurrence of natural enemies in treated and untreated control plots be recorded in all the treatments. Species composition of <i>Helopeltis</i>, <i>Pachypeltis</i> (<i>Dysphinctus</i>) <i>maesarum</i> be determined</p>	<p>Being done</p> <p>Recorded</p> <p>Recorded</p>
<p>Expt.2 Control of minor pests</p> <p>The pest population and parasitoid /predator loads be recorded at periodic intervals. The prevalent weather parameters be recorded along with pest incidence.</p>	<p>Being done</p>
<p>Expt.3. Control of foliage /inflorescence pests at neem products.</p> <p>The experiment be started at this centre. In place of the treatment, neem cake extract (5%), cotton seed oil (2%) be included and bio efficiency be determined, of the plant products used.</p>	<p>Will be conducted during 96-97.</p>
<p>Ent2. Expt.1 Control of stem and root borer. Prophylactic control trial.</p> <p>The experiment is to be continued. Kaoline treatment (T1) be replaced by mudslurry with Carbaryl (0.25%). The treatment T7 of 3 kg Neem cake/tree basin be deleted.</p> <p>Cost economics to be calculated for all the treatments.</p>	<p>Done</p>

<p>Ent.3. Bio-ecology of pests of regional importance and survey of pests complex and natural enemies.</p> <p>A report containing additional data on pest incidence for all the 12 months along with correlated weather parameters be resubmitted.</p> <p>Natural enemy population are to be concurrently recorded along with weather parameters for all the months. Alternate hosts of TMB be closely observed for population fluctuations of the pests . The TMB samples be send to NRC for cashew, for identification.</p> <p>The new Nematologist should visit NRCC for discussion with Entomologist of NRCC regarding collection of data in Entomology experiments . The data for annual reports be sent as per prescribed format.</p>	<p>Being done</p> <p>Being done</p> <p>Will be visiting during May 2nd week of 96</p>
<p>Ent.4. Screening of germplasm to locate tolerance /resistance to major pests of the region.</p> <p>Pattern of flowering (early/late/synchronised/non-synchronised) of the germplasm to be recorded.</p> <p>Field confinement studies to be initiated on tolerant lines and grafts already prepared are to be cage screened.</p> <p>Field confinement studies on nine tolerant lines of TMB taken up by Oct-Nov 1995.</p> <p>Tree No. 856 to be included in this experiment.</p> <p>During the visit of the Director, it was decided that only those varieties which have the export grade nuts be multiplied and used for further planting in " the multiplication of varieties included in the package of practices" .</p> <p>Kottarakkara-1 be multiplied at Kottarakkara. Under regional nursery programme the Brazilian accessions be also be multiplied.</p>	<p>Recorded</p> <p>Done</p> <p>Done</p> <p>Included</p>

Extension

1. Training on cashew graft production

- i) Four batches of 20 unemployed youth (20 candidates per batch) were given training on Cashew graft production, for a period of 25 working days each.
- ii) Training on soft wood grafting was given to 18 students of VIIS, for a period of three weeks.

2. Demonstration plots on scientific cultivation on Cashew

18 cashew demonstration plots, each of 1 Acre size were laid out in Thrissur, Ernakulam and Palaghat districts, to demonstrate scientific cultivation of Cashew, using high yielding varieties

3. Cashew graft production

About 72,000 cashew grafts were produced and supplied to the farmers

4. Two day State Level Seminar on cashew

Two day State Level Seminar on cashew was conducted on 30th and 31st of January 1996. 100 farmers from different parts of the state participated. The Seminar was inaugurated by Sri. P. Gangadharan Pillai, Ex. Chairman, CEPCI, Cochin. Dr. E. Tajuddin, Director of Extension presided over the function. Sri. P.P. Balasubramanian, Director, Directorate of Cashewnut Development, Dr. K.G. Nair, Secretary CEPCI, Cochin, Dr. G.R. Pillai, Associate Director of Research, KAU Head Quarters, Dr. N. Krishnan Nair, Associate Director of Research, RARS, Pattambi and Dr. R. Vikraman Nair, Professor & Head, gave felicitation address.

5. Radio talks/Doordarshan programme

Planting and management of cashew	By Dr. M. Abdul Salam
Manuring of cashew	By Ms. Suma B.
Hybrids and varieties of cashew	By Dr. M. Abdul Salam
Date of broadcasting	7.10.95
Answers to listener's questions	By Dr. M. Abdul Salam
Date of broadcasting	15.10.95

Manuring of cashew
Date of broadcasting

By Dr. M. Abdul Salam
28.10.95

Answers to listener's questions
Date of broadcasting

By Dr. M. Abdul Salam
5.11.95

Stem borer control in cashew
Date of broadcasting

By Dr. Susannamma Kurien
11.11.95

Stem borer control in cashew
Date of broadcasting

By Dr. Susannamma Kurien
11.11.95

Answers to listener's questions
Date of broadcasting

By Dr. Susannamma Kurien
19.11.95

Agencies of Development of cashew
Date of recording
Date of broadcasting

11.12.95
23.3.96

Answers to listener's questions
Date of recording

By Dr. M. Abdul Salam
28.3.96

Pest of cashew
Date of recording

By Dr. Susannamma Kurien
26.3.96

Meteorological data 1995-96

Month	Temperature(°C)		Relative humidity %(mean)	Rainfall (mm)	No. of rainy days
	Maximum	Minimum			
Apr. 95	36.6	24.9	71	118.7	5
May 95	33.5	23.9	78	370.5	13
June 95	31.6	23.1	86	500.4	19
July 95	29.9	23.2	89	884.7	26
Aug. 95	30.6	23.7	86	448.7	22
Sep. 95	30.1	23.5	82	282.5	13
Oct. 95	33.2	23.2	78	110.4	8
Nov. 95	31.3	22.5	80	88.4	5
Dec. 95	32.5	21.3	57	Nil	Nil
Jan. 96	33.1	22.4	53	Nil	Nil
Feb. 96	34.7	23.4	53	Nil	Nil
Mar. 96					