

CASHEW GERmplasm OF GOA : CHARACTERIZATION AND CATALOGUING - I

(*Anacardium occidentale* L.)

A. R. Desai and N. P. Singh

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ICAR Research Complex For Goa
(Indian Council of Agricultural Research)

Ela, Old Goa - 403 402, Goa, India

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Deputy Director General (Horticulture)

Foreword

Cashew, a native of North Eastern Brazil in Latin America, is one such exotic crop introduced into of Goa by the Portuguese during 1570 on the Western coast of the country mainly for soil conservation and afforestation. Now, it is being cultivated in 14 states as commercial plantation crop for domestic as well as international trade and bringing in considerable foreign exchange earnings of more than 2500 crores, annually. Initial introduction in to Goa was through seeds which subsequently led to the present day seedling plantations in the state of Goa. These plantations are reported to have the diversity, which could be utilized for potential gains. Thus, it becomes inevitable to explore, characterize, conserve these diversity for sustainable use in development of new cultivars. ICAR Research Complex at Goa has documented the promising germplasm accessions being maintained in its Farm at Old Goa. The Technical Bulletin, "Cashew germplasm of Goa: Characterization and Cataloguing" is an important document of cashew genetic resources, being brought out by the ICAR Research Complex for Goa.

I am sure, the valuable information compiled in this document would be useful for researchers, students and other stake holders involved in the cashew research and development. I compliment the authors for their efforts in compiling the information.


(H.P. Singh)

Preface

*C*ollection, evaluation and cataloguing of germplasm are the basic prerequisites of crop improvement programmes designed to utilize the germplasm resources. Cashew being an important commercial crop of Goa, has a lion share in the acreage. Many cashew plantations are of seedling progeny having mixed genetic material with enormous variability in the tree population. At the same time, the population is also reported to possess some natural recombinants with desired commercial traits which need to be conserved for further utilization. An attempt was, thus, made to identify and collect the potential genotypes through survey and germplasm accessions were characterized during the clonal evaluation during last 8- 10 years. In this exercise the passport data was compiled and the germplasm accessions were characterized for easily recognized morphological traits. Minimum IPGRI descriptors were applied to the cashew accessions for cataloguing the germplasm data on fifty vital traits. With a view to share this important information, the data is documented in the form of a Technical Bulletin "Cashew germplasm of Goa: Characterization and cataloguing". This document is a benchmark for cashew improvement programmes and is useful to researchers and students alike.

While bringing out this bench mark document, we sincerely acknowledge the opportunity and the encouragement extended by the ICAR, New Delhi for carrying out the research program on cashew. Our sincere thanks are due to Dr H. P. Singh, Deputy Director General (Horticulture) for kindly writing the 'Foreword' for this publication, the first document on genetic resources from this institute. We take this opportunity to copiously thank all the officials of the Directorate of Agriculture, Government of Goa and the progressive farmers of Goa for their whole hearted cooperation and assistance in collection of local cashew germplasm.

A. R. Desai.
N. P. Singh

CONTENTS

Particulars	Page No.
Foreword	
Preface	
Introduction	1
Description of Accessions	
G - CS - 4 - 5: Tiswadi - 3	11
G - CS - 4 - 7: Tiswadi - 7	13
G - CS - 4 - 8: Red local	15
G - CS - 4 - 9: GB - 2	17
G - CS - 4 - 9: GB - 3	19
GCC - 94/6: Dhawe - 1	21
GCC - 94/7: Dhawe - 2	23
GCC - 94/8: Dhawe-3	25
G - CS - 8 - 2: Valpoi - 1	27
G - CS - 8 - 3: Valpoi - 3	29
G - CS - 8 - 7: Valpoi - 7	31
G - CS - 7 - 7: KN - 2 /98	33
GCC - 94/10: Balli - 1	35
GCC - 94/11: Balli - 2	37
G - CS - 5 - 9: Khola - 2	39
G - CS - 5 - 15: Tudal -1	41
G - CS - 5 - 17: Tudal - 3	43
G - CS - 6 - 2: Loutoulim - 2	45
G - CS - 6 - 13: Ashley - 1	47
G - CS - 6 - 14: Raia - 1	49
GCC - 94/1: Ganje - 1	51
GCC - 94/2: Ganje - 2	53
G - CS - 1 - 2: Bardez - 2	55
G - CS - 1 - 3: Bardez - 3	57
G - CS - 1 - 12: Bardez - 8	59
G - CS - 1 - 9: Bardez - 9	61
G - CS - 2 - 5: Mayem - 1	63
Conclusion	65
References	65

Cashew Germplasm of Goa: Characterization and Cataloguing

(*Anacardium occidentale* L.)

Introduction

From the time of its introduction in Goa by Portuguese, Cashew had been cultivated mostly through seed propagation. Only from the recent times planting of cashew grafts of High Yielding Varieties (HYV) is gaining popularity. Still majority cashew plantations in Goa are of seedling origin and are making considerable contribution to the State's production. These plantations obviously possess highly heterozygous seedling population with genetically inferior and poor yielding trees, as a result of which the State's production and productivity are very low. However, it is equally important to note that the highly variable seedling progeny, due to random pollination and natural recombination of desirable genes, certainly possesses the potential genotypes which could play vital role in boosting the cashew production in the state. Therefore, identification, evaluation and conservation of such potential genotypes assume paramount significance in selecting the high yielding chance seedlings or promising trees.

With this background, a systematic survey in the state of Goa was launched during last one and half decade and the potential genotypes were identified. These are being clonally conserved in the Cashew Germplasm Bank" in the Institute's farm. Some of such clonal progenies, during their evaluation have led to vital selections of promising accessions (Desai, 2000).

An intensive survey was carried out during fruiting season in all the zones of Goa, with the help of Directorate of Agriculture, Goa,

Progressive farmers, Local Youth clubs, Charitable Institutes, Bagayatdar Societies, Missionary Institutes etc., for identification of the promising accessions.

The identification of the promising accessions was mainly based on three basic characters namely: higher nut yield per tree, medium to bold nut size and bigger sized apple. The trees identified thus, were marked for subsequent observations. Some such accessions with exceptionally higher nut yield irrespective of size of nut and apple, the accessions with jumbo nut size irrespective of nut yield and the genetic freaks with sterile nuts were also collected for further studies.

Subsequently, nucleus grafts were prepared from each mother tree by soft wood grafting method for further conservation and evaluation in the clonal germplasm bank at the institute's farm.

During the survey in all 90 germplasm accessions were identified from different cashew plantations spread over 10 Zones (Talukas).

Subsequently, the Clonal evaluation of these accessions was carried out and details of each genotype with respect to general growth characteristics of 8-14 years old trees, leaf characteristics, flowering and flower characteristics, apple characteristics, nut and kernel characteristics, and nut yield /tree were documented which are presented in subsequent pages.

Important characters with their descriptors of cashew accessions

During the collection and evaluation studies of cashew germplasm accessions, data was recorded on fifty important characters each of which is described by applying IPGRI minimum descriptors (IBPGR, 1986) for each accession as indicated by Swamy et al., (1986) Characterization of the germplasm accessions along with descriptors and IPGRI codes is summarized below in the tabular form, while the detailed descriptors with some photographs are catalogued for 27 accessions in the subsequent pages. Information about additional characters such as Incidence of Tea mosquito bug and cashew stem and root borer, Time of new flush, Inflorescence colour & size, number of rachis, per inflorescence, Total soluble solids of fruit juice, number of nuts per panicle, specific gravity of nuts kernel grade and nut yield per tree per year is also documented. For these characters, there are no standard codes.

Data Field	Character	IPGRI Code	Descriptor state	No. of accessions	Accession name
(1)	(2)	(3)	(4)	(5)	(6)
1	Age of tree (Years)	3.4	-	-	-
2	Height of tree (m)	6.1.1	3 Dwarf (<2.5m)	-	
			5 Semi-tall (2.5-4.0m)	2	GB-2, Bardez-3,
			7 Tall (>4.0m)	25	Tiswadi 3, Tiswadi 7, Red Local, , Dhave-1, GB-3, Dhave-2, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-8, Bardez-9, Mayem-1
3	Tree habit	4.1.1	3 Upright and Compact	15	Tiswadi 3, GB-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Tudal-3, Loutolim-2, Ashley-1, Bardez-2, Bardez-3, Bardez-8, Bardez-9,
			5 Upright and Open	9	Tiswadi 7, Red Local, GB-2, Dhave-2, Dhave-3, Tudal-1, Raia-1, Ganje-1, Mayem-1
			7 Spreading	3	Dhave-1, Khola-2, Ganje-2,

(1)	(2)	(3)	(4)	(5)	(6)
4	Branching pattern	6.1.8	1 Extensive	15	Tiswadi 3, Tiswadi 7, Red Local, GB-2, Dhave-1, Dhave-2, Dhave-3, KN-2/98, Balli-1, Balli-2, Tudal-3, Loutolim-2, Ganje-2, Bardez-3, Mayem-1
			2 Intensive	12	GB-3, Valpoi-1, Valpoi-3, Valpoi-7, Khola-2, Tudal-1, Ashley-1, Raia-1, Ganje-1, Bardez-2, Bardez-8, Bardez-9,
5	Canopy Size : NS x EW (m ²)	6.1.2	3 Low (<3.0m)	-	-
			5 Intermediate (3.0-6.0m)	5	Tiswadi 3, KN-2/98, Tudal-3, Bardez-3, Bardez-9,
			7 High (>6.0m)	22	Tiswadi 7, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, Balli-1, Balli-2, Tudal-1, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-8, Mayem-1
6	Incidence of TMB & CSRB	-	-	-	-
7	Time of new flush	-	-	-	-
8	Colour of young leaves	6.1.11	1 Red	10	Dhave-1, Dhave-2, Valpoi-1, Valpoi-7, Balli-2, Loutolim-2, Bardez-2, Bardez-3, Bardez-9, Mayem-1
			2 Yellow Red	13	Tiswadi 3, Tiswadi 7, Red Local, Dhave-3, Valpoi-3, KN-2/98, Balli-1, Tudal-1, Tudal-3, Ashley-1, Raia-1, Ganje-1, Ganje-2,
			3 Green Yellow	4	GB-2, GB-3, Khola-2, Bardez-8,
			4 Purple	-	-
9	Colour of mature leaves	6.1.12	1 Light Green	3	Dhave-3, Balli-1, Khola-2,
			2 Green	19	Tiswadi 3, Tiswadi 7, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Valpoi-1, Valpoi-7, KN-2/98, Balli-2, Tudal-1, Tudal-3, Ashley-1, Ganje-1, Ganje-2, Bardez-2, Bardez-8, Mayem-1
			3 Dark Green	5	Valpoi-3, Loutolim-2, Raia-1, Bardez-3, Bardez-9,
			4 Purple	-	-

(1)	(2)	(3)	(4)	(5)	(6)
10	Number of leaves per twig	6.1.10	3 Low (<9)	4	Valpoi-1, Tudal-1, Ashley-1, Ganje-1,
			5 Medium (9-19)	23	Tiswadi 3, Tiswadi 7, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Dhave-3, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-3, Loutolim-2, Raia-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
			7 High(>19)	-	-
11	Leaf shape	4.1.3	1 Oblong	1	Ashley-1,
			2 Obovate (club shaped)	23	Tiswadi 7, Red Local, GB-2, Dhave-1, Dhave-2, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Tudal-1, Tudal-3, Loutolim-2, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
			3 Oval	3	Tiswadi -3, GB-3, Khola-2,
12.	Leaf apex shape	6.1.15	1 Pointed	-	-
			2 Rounded	19	Tiswadi -3, Tiswadi -7, Red Local, GB-3, Dhave-3, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Bardez-2, Bardez-3, Bardez-9, Mayem-1
			3 Indented (slight notch)	8	GB-2, Dhave-1, Dhave-2, Valpoi-1, Balli-2, Khola-2, Ganje-2, Bardez-8,
13	Leaf size : L x B (cm ²)	6.1.16	3 Small (<60 cm ²)	-	-
			5 Intermediate (60-120 cm ²)	6	Tiswadi -3, Valpoi-1, Valpoi-3, Balli-1, Tudal-1 Bardez-2,
			7 Large (>120 cm ²)	21	Tiswadi -7, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Dhave-3, Valpoi-7, KN-2/98, Balli-2, Khola-2, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
14	Brittleness of leaf	6.1.17	3 Leathery	23	Tiswadi -3, Tiswadi -7, Red Local, Valpoi-1, GB-2, Dhave-1, GB-3, Dhave-2, Dhave-3, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-1, Tudal-3, Loutolim-2, Raia-1, Ganje-2, Bardez-2, Bardez-3, Bardez-9,
			7 Brittle	4	Ashley-1, Ganje-1, Bardez-8, Mayem-1

(1)	(2)	(3)	(4)	(5)	(6)
15	Angle of leaf	6.1.18	3 Acute (<90°)	25	Tiswadi 3, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-1, Tudal-3, Loutolim-2, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
			7 Obtuse (>90°)	2	Tiswadi 7, Ashley-1,
16	Flowering Season	4.2.1	3 Early (Nov-Dec)	11	Tiswadi 3, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Dhave-3, Balli-1, Bardez-2, Bardez-3, Bardez-8,
			5 Mid (Dec-Jan)	14	Tiswadi 7, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-2, Khola-2, Tudal-1, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-9,
			7 Late (Jan-Feb)	2	Tudal-3, Mayem-1
17	Inflorescence Colour	-	-	-	-
18	Inflorescence shape	4.2.2	3 Narrowly pyramidal	3	KN-2/98, Tudal-3, Bardez-8,
			5 Pyramidal	14	Tiswadi 3, GB-3, Dhave-2, Dhave-3, Valpoi-7, Ashley-1, Khola-2, Tudal-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-9, Mayem-1
			7 Broadly Pyramidal	10	Tiswadi 7, Red Local, GB-2, Dhave-1, Valpoi-1, Valpoi-3, Balli-1, Balli-2, Loutolim-2, Bardez-3,
19	Compactness of Inflorescence	6.2.3	3 Loose	23	Tiswadi 3, Tiswadi 7, Dhave-1, GB-3, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Khola-2, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
			7 Compact	4	Red Local, GB-2, Dhave-2, Balli-2,
20	Inflorescence branching	6.2.4	1 All around main axis	27	Tiswadi 3, Tiswadi 7, Red Local, GB-2, GB-3, Dhave-1, Dhave-2, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
			2 Two sided	-	-

(1)	(2)	(3)	(4)	(5)	(6)
21	Flower colour	4.2.3	1 White	-	-
			2 Cream	2	Tiswadi 3, Valpoi-3,
			3 Pink	25	Tiswadi 7, Red Local, GB-2, Dhava-1, GB-3, Dhava-2, Dhava-3, Valpoi-1, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
22	Flowering duration (days)	11.2.1	3 Short (<60 days)	3	Bardez-8, Bardez-9, Mayem-1
			5 Medium (60-90 days)	23	Tiswadi 3, Tiswadi 7, Red Local, GB-2, Dhava-1, GB-3, Dhava-2, Dhava-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3,
			7 Long (>90 days)	1	Raia-1,
23	Inflorescence size : l x b (cm ²)	6.2.2	-	-	-
24	Number of rachis per inflorescence		-	-	-
25	Flowering intensity (%)	11.2.2	3 Low (<40%)	-	-
			5 Medium (40-70%)	10	Tiswadi 3, Valpoi-3, Khola-2, Tudal-1, Tudal-3, Ashley-1, Ganje-1, Bardez-3, Bardez-8, Mayem-1
			7 High (>70%)	17	Tiswadi 7, Red Local, GB-2, Dhava-1, GB-3, Dhava-2, Dhava-3, Valpoi-1, Valpoi-7, Balli-1, Balli-2, Loutolim-2, Raia-1, Ganje-2, Bardez-2, Bardez-9,
26	Apple colour	4.2.4	1 Yellow	15	GB-2, Dhava-1, Dhava-3, Valpoi-1, Valpoi-3, Valpoi-7, Balli-1, Balli-2, Tudal-3, Loutolim-2, Ashley-1, Ganje-2, Bardez-3, Bardez-8, Bardez-9,
			2 Red	8	Tiswadi 7, Red Local, GB-3, KN-2/98, Raia-1, Ganje-1, Bardez-2, Mayem-1
			3 Yellow Red	4	Tiswadi 3, Dhava-2, Khola-2, Tudal-1
			4 Red Purple	-	-

(1)	(2)	(3)	(4)	(5)	(6)
27	Apple shape	4.2.5	1 Cylindrical	14	Tiswadi 3, Tiswadi 7, GB-2, Dhave-1, Dhave-2, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, Tudal-3, Raia-1, Ganje-1, Bardez-3, Bardez-8, Bardez-9,
			2 Conical-obovate	6	GB-3, Red Local, Balli-1, Balli-2, Bardez-2, Mayem-1
			3 Round	3	Khola-2, Ganje-2, Khola-2,
			4 Pyriform	4	KN-2/98, Tudal-1, Loutolim-2, Ashley-1,
28	Apple size : l x b (cm ²)	6.2.8	-	-	-
29	Apple weight (g)	6.2.9	3 Low (<27g)	-	-
			5 Medium (27-52g)	1	Bardez-2,
			7 High (>52g)	25	Tiswadi 3, Tiswadi 7, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
30	Cavity at apex of apple	6.2.14	0 Absent	-	-
			3 Shallow	14	Tiswadi 3, GB-2, Dhave-1, GB-3, Dhave-3, Valpoi-1, Valpoi-3, KN-2/98, Balli-1, Balli-2, Tudal-3, Loutolim-2, Bardez-8, Bardez-9,
			7 Deep	13	Tiswadi 7, Red Local, Dhave-2, Valpoi-7, Khola-2, Tudal-1, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Mayem-1
31	Apple skin	6.2.17	1 Smooth and glossy	26	Tiswadi 3, Tiswadi 7, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Dhave-3, Valpoi-1, Valpoi-7, KN-2/98, Balli-2, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
			2 Rough and dull	1	Khola-2,
32	TSS (°B)	-	-	-	-
33	Number of nuts per panicle	-	-	-	-

(1)	(2)	(3)	(4)	(5)	(6)
34	Average nut weight (g)	4.2.8	3 Low (<5g)	-	-
			5 Intermediate (5-7g)	2	GB-3, Red Local
			7 High (>7g)	25	Tiswadi 3, Tiswadi 7, GB-2, Dhave-1, Dhave-2, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
35	Nut length (cm)	6.2.33	-	-	-
36	Nut thickness (cm)	6.2.33	-	-	-
37	Nut width (cm)	6.2.33	-	-	-
38	Nut shell colour	4.2.6	1 Buff	9	Valpoi-1, Balli-2, Valpoi-3, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Bardez-8, Mayem-1
			2 Grey	18	Tiswadi 3, Tiswadi 7, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Valpoi-7, KN-2/98, Balli-1, Khola-2, Tudal-1, Tudal-3, Ganje-2, Bardez-2, Bardez-3, Bardez-9,
			3 Purple	-	
39	Nut shape	4.2.7	1 Kidney	21	Tiswadi 3, Tiswadi 7, Red Local, GB-2, GB-3, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-3, Raia-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9, Mayem-1
			2 Oblong-ellipsoid	6	Dhave-1, Dhave-2, Tudal-1, Loutolim-2, Ashley-1, Ganje-1,
40	Flank of nut	6.2.27	3 Flattened	8	Tiswadi 3, Dhave-1, Red local, Dhave-2, Valpoi-1, Ganje-1, Bardez-2, Mayem-1
			5 Round	5	GB-2, GB-3, Balli-1, Balli-2, Khola-2,
			7 Bulging	14	Tiswadi 7, Dhave-3, Valpoi-3, Valpoi-7, KN-2/98, Tudal-1, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Ganje-2, Bardez-3, Bardez-8, Bardez-9,

(1)	(2)	(3)	(4)	(5)	(6)
41	Specific gravity of nut	-	-	-	-
42	Shell thickness (mm)	6.2.31	3 Thin (<2.5 mm)	1	GB-3,
			5 Intermediate (2.5-4.0mm)	22	Tiswadi 7, Red Local, GB-2, Dhave-2, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-1, Balli-2, Khola-2, Tudal-1, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Bardez-9,
			7 Thick (>4.0mm)	4	Tiswadi 3, Dhave-1, Tudal-3, Mayem-1
43	Filling of shell	-	-	-	-
44	Shelling (%)	4.3.1	3 Low (<18.0%)	-	-
			5 Intermediate (18.0-28.0%)	8	Dhave-2, Balli-1, Tudal-1, Tudal-3, Loutolim-2, Ganje-1, Bardez-3, Bardez-9,
			7 High (>28.0%)	19	Tiswadi 3, Tiswadi 7, Red Local, GB-2, Dhave-1, GB-3, Dhave-3, Valpoi-1, Valpoi-3, Valpoi-7, KN-2/98, Balli-2, Khola-2, Ashley-1, Raia-1, Ganje-2, Bardez-2, Bardez-8, Mayem-1
45	Kernel weight (g)	4.3.2	3 Low (<1.2g)	-	-
			5 Intermediate (1.2-2.5g)	18	Tiswadi 7, Red Local, GB-2, GB-3, Dhave-2, Dhave-3, Valpoi-7, Balli-1, Balli-2, Loutolim-2, Ashley-1, Raia-1, Ganje-1, Ganje-2, Bardez-2, Bardez-3, Bardez-8, Mayem-1
			7 High (>2.5g)	9	Tiswadi 3, Dhave-1, Valpoi-1, Valpoi-3, KN-2/98, Khola-2, Tudal-1, Tudal-3, Bardez-9,
46	Kernel grade	-	-	-	-
47	Attachment of peel to kernel	4.3.3	3 Loose	19	Tiswadi 3, Tiswadi 7, Red Local, GB-2, Dhave-1, GB-3, Dhave-3, Valpoi-1, Valpoi-7, KN-2/98, Khola-2, Tudal-1, Tudal-3, Ashley-1, Raia-1, Ganje-2, Bardez-2, Bardez-3, Mayem-1
			7 Tight	8	Dhave-2, Balli-1, Balli-2, Loutolim-2, Ganje-1, Bardez-8, Bardez-9,
48	Colour of testa	-	-	-	-

(1)	(2)	(3)	(4)	(5)	(6)
49	Nut yield /tree/year (kg)	-	-	-	-
50	Apple to nut ratio	11.2.3	3 Low (<6.0)	-	-
			5 Medium (6.0-12.0)	22	Tiswadi 7, Red Local, GB-2, Dhave-1, GB-3, Dhave-2, Dhave-3, Valpoi-1, Valpoi-7, Balli-1, Balli-2, Tudal-3, Loutolim-2, Ashley-1, Raia-1, Bardez-3, Ganje-1, Ganje-2, Bardez-2, Bardez-8, Bardez-9, Mayem-1
			7 High (>12.0)	5	Tiswadi 3, Valpoi-3, KN-2/98, Kholat-2, Tudal-1,

Accession Number	G-CS-4-5
Accession Name	Tiswadi – 3
Village	Ela
Name of Zone:	Tiswadi (North Goa)

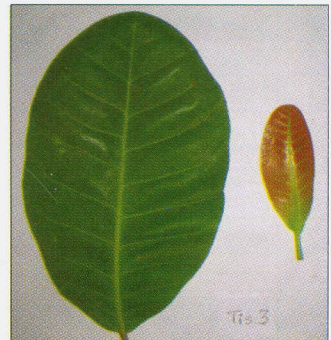


General growth Characteristics of tree

1	Approximate age (Years)	12
2	Height of tree (m)	4.6
3	Tree habit	Upright & compact
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	6.4 x 5.7
6	Incidence of TMB & CSRB	Not affected by both pests

Leaf Characteristics :

7	Time of new flush	November
8	Colour of new leaves	Yellow red
9	Colour of mature leaves	Green
10	Number of leaves per twig	14.2
11	Leaf shape	Oval
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	18.06 X 9.45
14	Brittleness of leaf	Leathery
15	Angle of leaf	Obtuse



Flowering and Flower characteristics:

6	Flowering Season	Early
17	Inflorescence Colour	Light Brown
18	Inflorescence shape	Broadly Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	79 (Medium)
23	Inflorescence size : l x b (cm ²)	20.47 X 22.64
24	No. rachis / inflorescence	6.73
25	Flowering intensity (%)	65.51



Apple Characteristics:



26	Apple colour	Yellow orange
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	8.26 X 6.9
29	Apple weight (g)	123.0
30	Cavity	Shallow
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.8

Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	1.16
34	Average nut weight (g)	9.48
35	Nut length (cm)	4.43
36	Nut thickness (cm)	2.18
37	Nut width (cm)	3.4
38	Nut shell colour	Ash gray
39	Nut shape	Kidney
40	Flank of nut	Flattened
41	Specific gravity of nut	1.07
42	Shell thickness (mm)	4.7
43	Filling of shell	Full
44	Shelling (%)	28.82
45	Kernel weight (g)	3.96
46	Kernel grade	W180
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Brown
49	Nut yield /tree/year (kg)	9 - 12
50	Apple to Nut ratio	12.9



Accession Number	G – CS – 4 – 7
Accession Name	Tiswadi-7
Village	Ela
Name of Zone:	Tiswadi (North Goa)

General growth Characteristics tree:

1	Approximate age (Years)	8
2	Height of tree (m)	6.4
3	Tree habit	Upright and open
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	14.8 X 13.6
6	Reaction to TMB & CSRB	Not affected by both

Leaf Characteristics :

7	Time of new flush	November
8	Colour of new leaves	Yellow red
9	Colour of mature leaves	Green
10	Number of leaves per twig	10.5
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	14.8 x 11.2
14	Brittleness of leaf	Leathery
15	Angle of leaf	Obtuse



Flowering and Flower characteristics:



16	Flowering Season	Mid season (Dec. Jan.)
17	Inflorescence Colour	Pink
18	Inflorescence shape	Broadly Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	70-80
23	Inflorescence size : l x b (cm ²)	20.4 X 24.6
24	Number of rachis per inflorescence	10.0
25	Flowering intensity (%)	75.23

Apple Characteristics:

26	Apple colour	Red
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	7.1 X 6.1
29	Apple weight (g)	71.12
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.8



Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	2.6
34	Average nut weight (g)	8.0
35	Nut length (cm)	3.38
36	Nut thickness (cm)	1.86
37	Nut width (cm)	2.48
38	Nut shell colour	Gray
39	Nut shape	Kidney
40	Flank of nut	Bulged
41	Specific gravity of nut	1.00
42	Shell thickness (mm)	3.4
43	Filling of shell	Full
44	Shelling (%)	29.8
45	Kernel weight (g)	2.38
46	Kernel grade	W210-W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	8 – 10
50	Apple to nut ratio	8.8 (Medium)



Accession Number	G – CS – 4 – 8
Accession Name	Red local
Village	Ela
Name of Zone:	Tiswadi (North Goa)

General Characteristics of tree:

1	Approximate age (Years)	>10
2	Height of tree (m)	5.7
3	Tree habit	Upright & open
4	Branching pattern	Extensive
5	Canopy Size: NS x EW (m ²)	11.7 X 10.4
6	Incidence of TMB & CSRB	Not affected by both pests

Leaf Characteristics:

7	Time of new flush	Starting of November
8	Colour of new leaves	Yellow Red
9	Colour of mature leaves	Green
10	Number of leaves per twig	10.43
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size: L x B (cm ²)	17.4 x 10.8
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:



16	Flowering Season	Early
17	Inflorescence Colour	Pink
18	Inflorescence shape	Broadly pyramidal
19	Compactness of Inflorescence	Compact
20	Inflorescence branching	All round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	70-75 (Medium)
23	Inflorescence size: l x b (cm ²)	22.18 X 23.68
24	Number of rachis per inflorescence	8.26
25	Flowering intensity (%)	75.0

Apple Characteristics:

26	Apple colour	Red
27	Apple shape	Conical Obovate
28	Apple size: l x b (cm ²)	4.3 X 4.69
29	Apple weight (g)	68.53
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.5



Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	5.93
34	Average nut weight (g)	6.4
35	Nut length (cm)	2.59
36	Nut thickness (cm)	1.7
37	Nut width (cm)	2.18
38	Nut shell colour	Gray
39	Nut shape	Kidney
40	Flank of nut	Rounded
41	Specific gravity of nut	1.0
42	Shell thickness (mm)	3.16
43	Filling of shell	Full
44	Shelling (%)	29.83
45	Kernel weight (g)	1.44
46	Kernel grade	W-320
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Brown
49	Nut yield /tree/year (kg)	12-15
50	Apple nut ratio	9.26



Accession Number	G – CS – 4 – 9
Accession Name	GB – 2
Village	Ela
Name of Zone:	Tiswadi (North Goa)

General Characteristics of mother tree:

1	Approximate age (Years)	>30
2	Height of tree (m)	5.7
3	Tree habit	Upright & open
4	Branching pattern	Extensive
5	Canopy Size: NS x EW (m ²)	16.7 X 14.4
6	Incidence of TMB & CSRB	Not affected by both pests



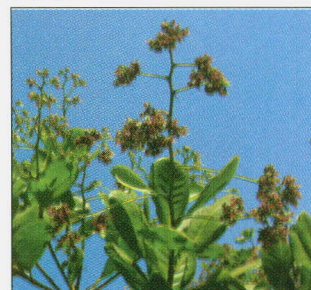
Leaf Characteristics:



7	Time of new flush	Starting of December
8	Colour of new leaves	Green yellow
9	Colour of mature leaves	Green
10	Number of leaves per twig	10.93
11	Leaf shape	Obovate
12	Leaf apex	Indented
13	Leaf size: L x B (cm ²)	16.56 X 10.1
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

Flowering and Flower characteristics:

16	Flowering Season	Early
17	Inflorescence Colour	Pink
18	Inflorescence shape	Broadly pyramidal
19	Compactness of Inflorescence	Compact
20	Inflorescence branching	All round the Axis
21	Flower colour	Dark Pink
22	Flowering duration (days)	75 (Medium)
23	Inflorescence size: l x b (cm ²)	22.18 X 23.68
24	Number of rachis per inflorescence	8.26
25	Flowering intensity (%)	85.0



Apple Characteristics:

26	Apple colour	Yellow
27	Apple shape	Pear shaped
28	Apple size: l x b (cm ²)	7.3 X 5.69
29	Apple weight (g)	61.53
30	Cavity	Sallow
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.5

Nut & kernel characteristics, and yield:

33	Number of nuts per panicle	3.93
34	Average nut weight (g)	7.2
35	Nut length (cm)	2.59
36	Nut thickness (cm)	1.7
37	Nut width (cm)	2.18
38	Nut shell colour	Gray
39	Nut shape	Kidney
40	Flank of nut	Rounded
41	Specific gravity of nut	1.0
42	Shell thickness (mm)	3.16
43	Filling of shell	Full
44	Shelling (%)	29.83
45	Kernel weight (g)	1.44
46	Kernel grade	W320 – W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Brown
49	Approx. Nut yield /tree/year (kg)	18.0
50	Apple to nut ratio	8.44 Medium



Accession Number	G – CS – 4 – 10
Accession Name	GB-3
Village	Ela
Name of Zone:	Tiswadi (North Goa)

General Characteristics of mother tree:

1	Approximate age (Years)	>14
2	Height of tree (m)	10.5
3	Tree habit	Upright & compact
4	Branching pattern	Intensive
5	Canopy Size: NS x EW (m ²)	8.7 X 7.1
6	Incidence of TMB & CSRB	Not affected By both pests

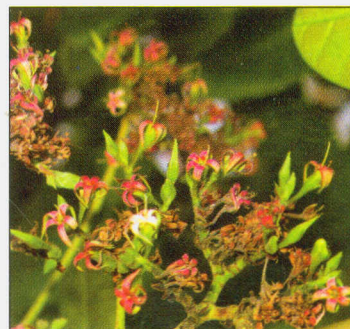
Leaf Characteristics:



7	Time of new flush	End of November
8	Colour of new leaves	Green Yellow
9	Colour of mature leaves	Green
10	Number of leaves per twig	12.0
11	Leaf shape	Oval
12	Leaf apex	Rounded
13	Leaf size: L x B (cm ²)	14.88 X 8.34
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

Flowering and Flower characteristics:

16	Flowering Season	Early
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	80- 87 (Long)
23	Inflorescence size: l x b (cm ²)	17.99 X 19.48
24	Number of rachis per inflorescence	8.0
25	Flowering intensity (%)	75.83



Apple Characteristics:

26	Apple colour	Red
27	Apple shape	Conical obovate
28	Apple size: l x b (cm ²)	4.88 X 4.22
29	Apple weight (g)	65.46
30	Cavity	Shallow
31	Apple skin	Smooth & glossy
32	TSS (° B)	14.6



Nut & kernel characteristics, and yield:

33	Number of nuts per panicle	3.46
34	Average nut weight (g)	6.8
35	Nut length (cm)	2.42
36	Nut thickness (cm)	1.52
37	Nut width (cm)	1.9
38	Nut shell colour	Ash gray
39	Nut shape	Kidney
40	Flank of nut	bulging
41	Specific gravity of nut	1.0
42	Shell thickness (mm)	2.24
43	Filling of shell	Full
44	Shelling (%)	30.26
45	Kernel weight (g)	1.47
46	Kernel grade	W320 –W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	10-15
50	Apple to nut ratio	9.5 (Medium)

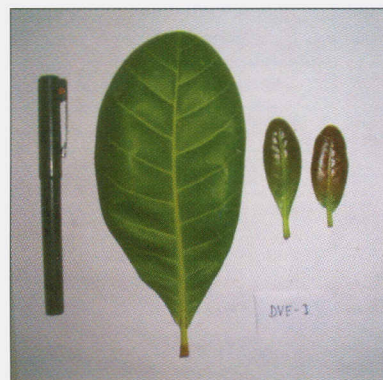
Accession Number	GCC - 94/6
Accession Name	Dhave-1
Village	Dhave
Name of Zone:	Sattari (North Goa)

General growth Characteristics of tree

1	Approximate age (Years)	12
2	Height of tree (m)	7.6
3	Tree habit	Upright & spreading
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	11.4 x 12.7
6	Incidence of TMB & CSRB	Not affected by both pests

Leaf Characteristics :

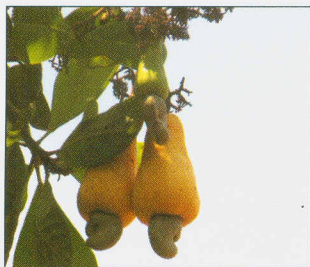
7	Time of new flush	November-December
8	Colour of new leaves	Red
9	Colour of mature leaves	Green
10	Number of leaves per twig	14.2
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	18.06 X 9.45
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:



16	Flowering Season	Early
17	Inflorescence Colour	white
18	Inflorescence shape	Broadly Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	79 (Medium)
23	Inflorescence size : l x b (cm ²)	20.47 X 22.64
24	No. rachis / inflorescence	6.73
25	Flowering intensity (%)	75.51

Apple Characteristics:

26	Apple colour	Yellow orange
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	8.26 X 6.9
29	Apple weight (g)	96.5
30	Cavity	Shallow
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.8

Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	1.16
34	Average nut weight (g)	8.9
35	Nut length (cm)	4.43
36	Nut thickness (cm)	2.18
37	Nut width (cm)	3.4
38	Nut shell colour	Ash gray
39	Nut shape	Ellipsoidal
40	Flank of nut	Flattened
41	Specific gravity of nut	1.07
42	Shell thickness (mm)	4.7
43	Filling of shell	Full
44	Shelling (%)	28.82
45	Kernel weight (g)	3.96
46	Kernel grade	W210-240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Brown
49	Nut yield /tree/year (kg)	7-9
50	Apple to nut ratio	10.84

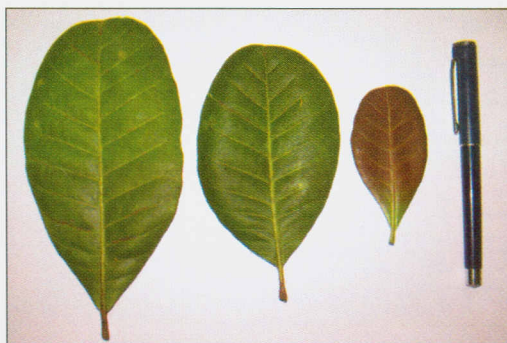


Accession Number	GCC - 94/7
Accession Name	Dhave- 2
Village	Dhave
Name of Zone:	Sattari (North Goa)

General Characteristics of tree:

1	Approximate age (Years)	>15
2	Height of tree (m)	7.2
3	Tree habit	Upright and openSpreading
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	9.8 X 10.6
6	Incidence of TMB & CSRB	Affected TMB

Leaf Characteristics :



7	Time of new flush	Mid October
8	Colour of new leaves	Red
9	Colour of mature leaves	Green
10	Number of leaves per twig	12.6
11	Leaf shape	Obovate
12	Leaf apex	Indented
13	Leaf size : L x B (cm ²)	17.06 X 9.68
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

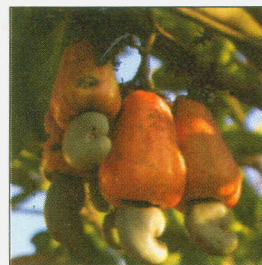
Flowering and Flower characteristics:

16	Flowering Season	Early
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Compact
20	Inflorescence branching	All round the axis
21	Flower colour	Pink
22	Flowering duration (days)	79 (medium)
23	Inflorescence size : l x b (cm ²)	18.35 X 17.2
24	Number of rachis per inflorescence	9.12
25	Flowering intensity (%)	74.50



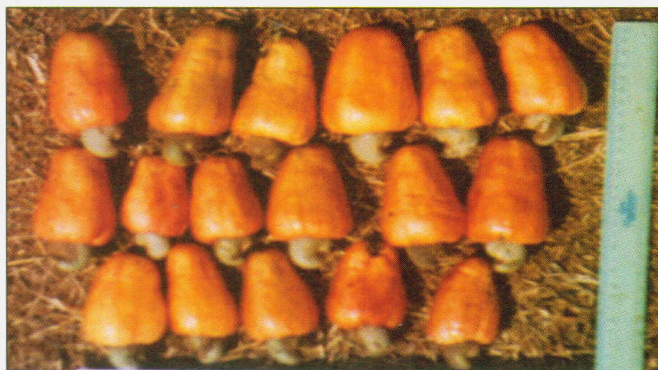
Apple Characteristics:

26	Apple colour	Red – orange
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	7.60 X 4.69
29	Apple weight (g)	88.5
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	14.2



Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	3.46
34	Average nut weight (g)	8.4
35	Nut length (cm)	3.8
36	Nut thickness (cm)	2.6
37	Nut width (cm)	2.2
38	Nut shell colour	Gray
39	Nut shape	Oblong ellipsoidal
40	Flank of nut	Flattened
41	Specific gravity of nut	1.03
42	Shell thickness (mm)	2.55
43	Filling of shell	Partial
44	Shelling (%)	26.63
45	Kernel weight (g)	1.86
46	Kernel grade	W240
47	Attachment of peel to kernel	Tight
48	Colour of testa	Brown
49	Nut yield /tree/year (kg)	12 – 15
50	Apple to nut ratio	10.53



Accession Number	GCC - 94/8
Accession Name	Dhave-3
Village	Dhave
Name of Zone:	Sattari (North Goa)

General growth Characteristics of tree

1	Approximate age (Years)	10
2	Height of tree (m)	8.2
3	Tree habit	Upright & spreading
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	11.2 x 10.7
6	Incidence of TMB & CSRB	Affected by both pests

Leaf Characteristics :

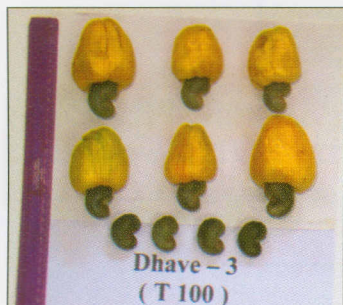


7	Time of new flush	November-December
8	Colour of new leaves	Yellow Red
9	Colour of mature leaves	Light Green
10	Number of leaves per twig	10.2
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	14.06 X 9.45
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

Flowering and Flower characteristics:

6	Flowering Season	Early
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	79 (Medium)
23	Inflorescence size : l x b (cm ²)	20.47 X 22.64
24	No. rachis / inflorescence	8.73
25	Flowering intensity (%)	75.51



Apple Characteristics:

26	Apple colour	Yellow
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	7.86 X 6.9
29	Apple weight (g)	79.3
30	Cavity	Shallow
31	Apple skin	Smooth & glossy
32	TSS (° B)	11.6

Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	2.66
34	Average nut weight (g)	7.48
35	Nut length (cm)	3.24
36	Nut thickness (cm)	2.18
37	Nut width (cm)	2.9
38	Nut shell colour	Ash gray
39	Nut shape	Kidney
40	Flank of nut	Bulging
41	Specific gravity of nut	1.07
42	Shell thickness (mm)	2.6
43	Filling of shell	Full
44	Shelling (%)	28.82
45	Kernel weight (g)	1.96 - 2.1
46	Kernel grade	W320 – W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Brown
49	Nut yield /tree/year (kg)	7-9
50	Apple to nut ratio	10.67 (Medium)

Accession Number	G – CS – 8 – 2
Accession Name	Valpoi – 1
Village	Dhave
Name of Zone:	Sattari (North Goa)

General Characteristics of tree:

1	Approximate age (Years)	>10
2	Height of tree (m)	4.9
3	Tree habit	Upright & compact
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	14.5 X 11.45
6	Incidence of TMB & CSRB	Not affected

Leaf Characteristics :

7	Time of new flush	November
8	Colour of new leaves	Red
9	Colour of mature leaves	Green
10	Number of leaves per twig	8.8
11	Leaf shape	Obovate
12	Leaf apex	Indented
13	Leaf size : L x B (cm ²)	16.34 X 7.83
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:



16	Flowering Season	Mid season
17	Inflorescence Colour	Pink
18	Inflorescence shape	Broadly pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	61 (Medium)
23	Inflorescence size : l x b (cm ²)	21.87 X 21.0
24	Number of rachis per inflorescence	7.66
25	Flowering intensity (%)	71.5

Apple Characteristics:

26	Apple colour	Yellow
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	7.32 X 5.11
29	Apple weight (g)	106.0
30	Cavity	Shallow
31	Apple skin	Smooth & glowing
32	TSS (° B)	10.8



Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	2.66
34	Average nut weight (g)	9.23
35	Nut length (cm)	3.74
36	Nut thickness (cm)	2.08
37	Nut width (cm)	2.68
38	Nut shell colour	Buff
39	Nut shape	Kidney
40	Flank of nut	Flattened
41	Specific gravity of nut	1.02
42	Shell thickness (mm)	3.53
43	Filling of shell	Full
44	Shelling (%)	28.21
45	Kernel weight (g)	3.17
46	Kernel grade	W210 – W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	20 - 25
50	Apple to nut ratio	10.9 (Medium)



Accession Number	G – CS – 8 – 3
Accession Name	Valpoi – 3
Village	Dhave (Polekar wado)
Name of Zone:	Sattari (North Goa)

General Growth Characteristics of tree

1	Approximate age (Years)	9
2	Height of tree (m)	8.5
3	Tree habit	Upright & compact
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	8.8 x 7.6
6	Incidence of TMB & CSRB	Not affected

Leaf Characteristics :

7	Time of new flush	November
8	Colour of new leaves	Yellow red
9	Colour of mature leaves	Dark green
10	Number of leaves per twig	12.33
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	16.57 X 7.30
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:



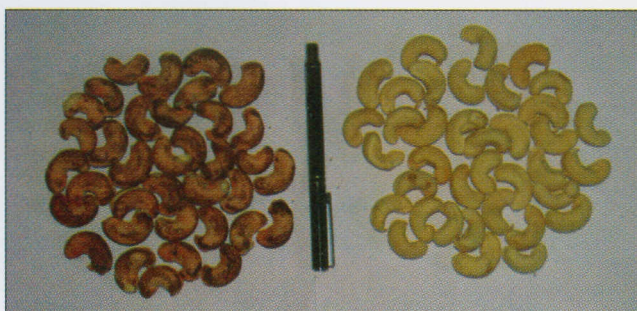
16	Flowering Season	Mid Season
17	Inflorescence Colour	Light Pink
18	Inflorescence shape	Broadly pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the Axis
21	Flower colour	Cream to light Pink
22	Flowering duration (days)	77 (Medium)
23	Inflorescence size : l x b (cm ²)	19.64 X 19.92
24	Number of rachis per inflorescence	8.33
25	Flowering intensity (%)	68.26

Apple Characteristics:

26	Apple colour	Yellow
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	8.5 X 5.75
29	Apple weight (g)	131.58
30	Cavity	Shallow
31	Apple skin	Smooth & glowing
32	TSS (° B)	11.55

**Nut and kernel characteristics, and yield:**

33	Number of nuts per panicle	3.26
34	Average nut weight (g)	8.28
35	Nut length (cm)	3.73
36	Nut thickness (cm)	2.13
37	Nut width (cm)	2.9
38	Nut shell colour	Buff
39	Nut shape	Kidney
40	Flank of nut	Bulging
41	Specific gravity of nut	1.03
42	Shell thickness (mm)	3.62
43	Filling of shell	Full
44	Shelling (%)	30.07
45	Kernel weight (g)	3.23
46	Kernel grade	W210- W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Brown
49	Nut yield /tree/year (kg)	15 – 18
50	Apple to nut ratio	15.8 (High)



Accession Number	G – CS – 8 – 7
Accession Name	Valpoi-7
Village	Valpoi
Name of Zone:	Sattari (North Goa)

General growth Characteristics tree:

1	Approximate age (Years)	10
2	Height of tree (m)	7.8
3	Tree habit	Upright and Compact
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	14.8 X 13.6
6	Reaction to TMB & CSRB	Not affected by both

Leaf Characteristics :

7	Time of new flush	Mid October - Mid November,
8	Colour of new leaves	Yellow red
9	Colour of mature leaves	Green
10	Number of leaves per twig	10.5
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	14.8 x 11.2
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

Flowering and Flower characteristics:

16	Flowering Season	Mid season (Dec. Jan.)
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	70-80
23	Inflorescence size : l x b (cm ²)	20.4 X 21.6
24	Number of rachis per inflorescence	10.0
25	Flowering intensity (%)	80.23

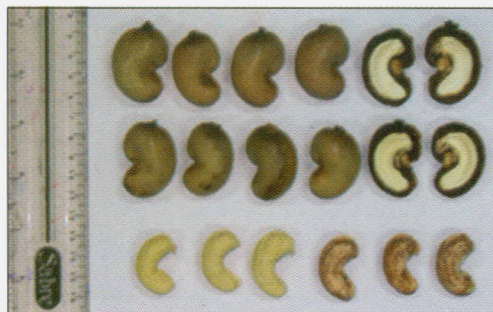
Apple Characteristics:



26	Apple colour	Yellow
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	7.1 X 6.1
29	Apple weight (g)	72.5
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.8

Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	5.6
34	Average nut weight (g)	8.3
35	Nut length (cm)	3.38
36	Nut thickness (cm)	1.86
37	Nut width (cm)	2.48
38	Nut shell colour	Gray
39	Nut shape	Kidney
40	Flank of nut	Bulged
41	Specific gravity of nut	1.00
42	Shell thickness (mm)	3.5
43	Filling of shell	Full
44	Shelling (%)	29.5
45	Kernel weight (g)	2.38
46	Kernel grade	W210-W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	15
50	Apple to nut ratio	8.7 (Medium)



Accession Number	G – CS – 7 – 7
Accession Name	KN- 2 /98
Village	Balli
Name of Zone:	Quepem (South Goa)

General growth Characteristics tree:



1	Approximate age (Years)	9
2	Height of tree (m)	4.5
3	Tree habit	Upright & compact
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	3.8 X 3.6
6	Reaction to TMB & CSRB	Susceptible to both

Leaf Characteristics :

7	Time of new flush	End of October
8	Colour of new leaves	Yellow red
9	Colour of mature leaves	Green
10	Number of leaves per twig	10.5
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	14.8 x 11.2
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:

16	Flowering Season	Mid season (Dec. Jan.)
17	Inflorescence Colour	Pink
18	Inflorescence shape	Narrowly Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	60 - 75
23	Inflorescence size : l x b (cm ²)	20.4 X 21.6
24	Number of rachis per inflorescence	8.0
25	Flowering intensity (%)	80.23



Apple Characteristics:

26	Apple colour	Red
27	Apple shape	Pyriform
28	Apple size : l x b (cm ²)	7.1 X 6.1
29	Apple weight (g)	121.12
30	Cavity	Shallow
31	Apple skin	Smooth & glowing
32	TSS (° B)	13.8

**Nut and kernel characteristics, and yield:**

33	Number of nuts per panicle	2.6
34	Average nut weight (g)	8.0
35	Nut length (cm)	3.38
36	Nut thickness (cm)	1.86
37	Nut width (cm)	2.48
38	Nut shell colour	Gray with violet tinge
39	Nut shape	Kidney
40	Flank of nut	Bulged
41	Specific gravity of nut	1.00
42	Shell thickness (mm)	3.59
43	Filling of shell	Full
44	Shelling (%)	29.59
45	Kernel weight (g)	2.68
46	Kernel grade	W210-W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Approx. Nut yield /tree/year (kg)	10 – 12
50	Apple to Nut ratio	15.12 (High)



Accession Number	GCC - 94/10
Accession Name	Balli-1
Village	Balli
Name of Zone:	Quepem(South Goa)

General Characteristics of mother tree:

1	Approximate age (Years)	>15
2	Height of tree (m)	12.8
3	Tree habit	Upright & compact
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	12.8 X 11.3
6	Incidence of TMB & CSRB	Not affected by TMB, affected by CSRB

Leaf Characteristics :

7	Time of new flush	Starting of October
8	Colour of new leaves	Yellow Red
9	Colour of mature leaves	Light Green
10	Number of leaves per twig	12.6
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	15.43 X 8.05
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:



16	Flowering Season	Very early
17	Inflorescence Colour	Pink
18	Inflorescence shape	Broadly pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the axis
21	Flower colour	Pink
22	Flowering duration (days)	82 (Medium)
23	Inflorescence size : l x b (cm ²)	21.54 X 25.55
24	Number of rachis per inflorescence	9.66
25	Flowering intensity (%)	80.7

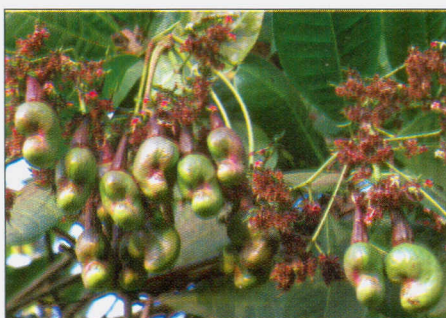
Apple Characteristics:



26	Apple colour	Yellow
27	Apple shape	Conical obovate
28	Apple size : l x b (cm ²)	7.4 X 5.6
29	Apple weight (g)	88.6
30	Cavity	Shallow
31	Apple skin	Smooth & glossy
32	TSS (° B)	12.5

Nut & kernel characteristics, and yield:

33	Number of nuts per panicle	7.2
34	Average nut weight (g)	8.9
35	Nut length (cm)	3.41
36	Nut thickness (cm)	2.22
37	Nut width (cm)	2.42
38	Nut shell colour	Gray
39	Nut shape	Kidney
40	Flank of nut	Rounded
41	Specific gravity of nut	1.01
42	Shell thickness (mm)	3.2
43	Filling of shell	Full
44	Shelling (%)	27.2-28.3
45	Kernel weight (g)	2.12 -2.2
46	Kernel grade	W210 – W240
47	Attachment of peel to kernel	Tight
48	Colour of testa	Brown
49	Nut yield /tree/year (kg)	15 – 18
50	Apple to nut ratio	10.2 (Medium)



Accession Number	GCC - 94/11
Accession Name	Balli-2
Village	Balli
Name of Zone:	Quepem(South Goa)

General Characteristics of tree:

1	Approximate age (Years)	>15
2	Height of tree (m)	10.6
3	Tree habit	Upright & compact
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	6.8 X 6.3
6	Incidence of TMB & CSRB	Escapes TMB, affected by CSRB

Leaf Characteristics :



7	Time of new flush	November
8	Colour of new leaves	Red
9	Colour of mature leaves	Green
10	Number of leaves per twig	12.86
11	Leaf shape	Obovate
12	Leaf apex	Indented
13	Leaf size : L x B (cm ²)	15.43 X 8.05
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

Flowering and Flower characteristics:

16	Flowering Season	Mid season
17	Inflorescence Colour	Pink
18	Inflorescence shape	BroadlyPyramidal
19	Compactness of Inflorescence	Compact
20	Inflorescence branching	All round the axis
21	Flower colour	Pink
22	Flowering duration (days)	90 - 100
23	Inflorescence size : l x b (cm ²)	21.54 X 25.55
24	Number of rachis per inflorescence	9.66
25	Flowering intensity (%)	78.7



Apple Characteristics:

26	Apple colour	Yellow
27	Apple shape	Conical obovate
28	Apple size : l x b (cm ²)	6.41 X 4.64
29	Apple weight (g)	70.66
30	Cavity	Shallow
31	Apple skin	Smooth & glossy
32	TSS (° B)	11.75

**Nut and kernel characteristics, and yield:**

33	Number of nuts per panicle	5.2
34	Average nut weight (g)	7.7
35	Nut length (cm)	3.07
36	Nut thickness (cm)	2.19
37	Nut width (cm)	2.3
38	Nut shell colour	Buff
39	Nut shape	Kidney
40	Flank of nut	Rounded
41	Specific gravity of nut	1.01
42	Shell thickness (mm)	3.3
43	Filling of shell	Full
44	Shelling (%)	30.0
45	Kernel weight (g)	2.0 -2.3
46	Kernel grade	W210 - W240
47	Attachment of peel to kernel	Tight
48	Colour of testa	Light Brown
49	Nut yield /tree/year (kg)	10 – 12
50	Apple to nut ratio	9.3

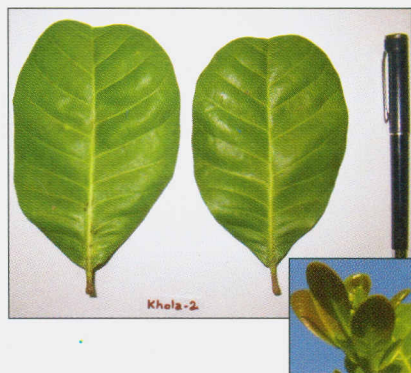


Accession Number	G-CS- 5 – 9
Accession Name	Khola – 2
Village	Khola
Name of Zone:	Canacona (South Goa)

General growth Characteristics of tree

1	Approximate age (Years)	9
2	Height of tree (m)	8.5
3	Tree habit	Spreading
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	6.9 x 7.0
6	Incidence of TMB & CSRB	Susceptible to both

Leaf Characteristics :



7	Time of new flush	Starting of November
8	Colour of new leaves	Green Yellow
9	Colour of mature leaves	Light Green
10	Number of leaves per twig	9.8
11	Leaf shape	Oval
12	Leaf apex	Indented
13	Leaf size : L x B (cm ²)	17.75 X 9.3
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

Flowering and Flower characteristics:

16	Flowering Season	Mid season
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	89 (Long)
23	Inflorescence size : l x b (cm ²)	19.64 X 21.06
24	Number of rachis per inflorescence	7.53
25	Flowering intensity (%)	68.75

Apple Characteristics:



26	Apple colour	Yellow Red
27	Apple shape	Round
28	Apple size : l x b (cm ²)	5.55 X 6.02
29	Apple weight (g)	117.66
30	Cavity	Deep
31	Apple skin	Rough & dull
32	TSS (° B)	13.36

Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	3.53
34	Average nut weight (g)	8.4
35	Nut length (cm)	3.49
36	Nut thickness (cm)	1.99
37	Nut width (cm)	2.64
38	Nut shell colour	Gray
39	Nut shape	Kidney
40	Flank of nut	Rounded
41	Specific gravity of nut	1.08
42	Shell thickness (mm)	3.67
43	Filling of shell	Full
44	Shelling (%)	28.47
45	Kernel weight (g)	2.57
46	Kernel grade	W210-W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	12.5
50	Apple to Nut ratio	13.9 (High)



Accession Number	G-CS- 5 -15
Accession Name	Tudal -1
Village	Tudal
Name of Zone:	Canacona (South Goa)

General Growth Characteristics of tree

1	Approximate age (Years)	10
2	Height of tree (m)	10.8
3	Tree habit	Upright and open
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	10.7 X 15.2
6	Incidence of TMB & CSRB	Not affected

Leaf Characteristics :



7	Time of new flush	Mid November
8	Colour of new leaves	Yellow red
9	Colour of mature leaves	Green
10	Number of leaves per twig	8.2
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	15.08 x 7.74
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

Flowering and Flower characteristics:

16	Flowering Season	Mid season
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the axis
21	Flower colour	Pink
22	Flowering duration (days)	86(Long)
23	Inflorescence size : l x b (cm ²)	19.83 x 22.45
24	Number of rachis per inflorescence	7.46
25	Flowering intensity (%)	48.85

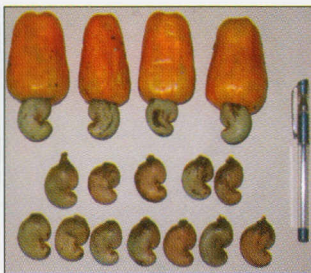


Apple Characteristics:

26	Apple colour	Orange
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	8.28 X 5.87
29	Apple weight (g)	150.0
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.68

Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	2.73
34	Average nut weight (g)	10.2
35	Nut length (cm)	3.99
36	Nut thickness (cm)	2.03
37	Nut width (cm)	3.04
38	Nut shell colour	Gray
39	Nut shape	Ellipsoidal
40	Flank of nut	Bulging
41	Specific gravity of nut	1.0
42	Shell thickness (mm)	3.2
43	Filling of shell	Full
44	Shelling (%)	27.76
45	Kernel weight (g)	2.72
46	Kernel grade	W180
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Whitish brown
49	Nut yield /tree/year (kg)	8 - 10
50	Apple to nut ratio	15.0 (High)



Accession Number	G-CS- 5 – 17
Accession Name	Tudal – 3
Village	Tudal
Name of Zone:	Canacona (South Goa)

General Growth Characteristics of tree:

1	Approximate age (Years)	8
2	Height of tree (m)	6.5
3	Tree habit	Upright & compact
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	5 x 4
6	Incidence of TMB & CSRB	Not affected

Leaf Characteristics :

7	Time of new flush	End November
8	Colour of new leaves	Yellow red
9	Colour of mature leaves	Green
10	Number of leaves per twig	10.66
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	19.26 X 9.23
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:

16	Flowering Season	Late
17	Inflorescence Colour	Pink
18	Inflorescence shape	Narrowly pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the axis
21	Flower colour	Pink
22	Flowering duration (days)	72 (Medium)
23	Inflorescence size : l x b (cm ²)	18.24 x 17.8
24	Number of rachis per inflorescence	7.66
25	Flowering intensity (%)	69.17



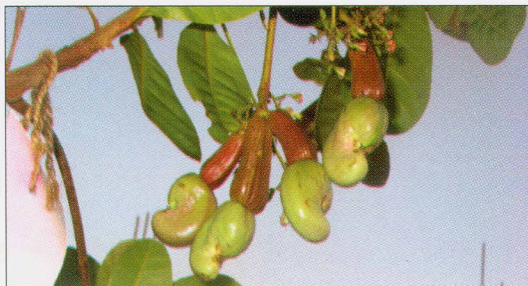
Apple Characteristics:

26	Apple colour	Yellow
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	7.24 X 6.26
29	Apple weight (g)	112.0
30	Cavity	Shallow
31	Apple skin	Smooth & glowing
32	TSS (° B)	15.6



Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	2.13
34	Average nut weight (g)	10.46
35	Nut length (cm)	4.08
36	Nut thickness (cm)	1.91
37	Nut width (cm)	2.95
38	Nut shell colour	Gray
39	Nut shape	Kidney
40	Flank of nut	Bulging
41	Specific gravity of nut	1.01
42	Shell thickness (mm)	4.23
43	Filling of shell	Partial
44	Shelling (%)	26.21
45	Kernel weight (g)	3.52
46	Kernel grade	W210
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Brown
49	Nut yield /tree/year (kg)	8.0
50	Apple to Nut ratio	10.71



Accession Number	G – CS – 6 – 2
Accession Name	Loutoulim – 2
Village	Loutoulim
Name of Zone:	Salcete (South Goa)

General Characteristics of tree:

1	Approximate age (Years)	>8
2	Height of tree (m)	6.4
3	Tree habit	Upright & compact
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	6.2 X 7.9
6	Incidence of TMB & CSRB	Not affected

Leaf Characteristics :

7	Time of new flush	End of October
8	Colour of new leaves	Red
9	Colour of mature leaves	Dark green
10	Number of leaves per twig	11.4
11	Leaf shape	Obovate
12	Leaf apex	Roundeded
13	Leaf size : L x B (cm ²)	17.4 X 8.26
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:

16	Flowering Season	Mid season
17	Inflorescence Colour	Pink
18	Inflorescence shape	Broadly Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	61 (Short)
23	Inflorescence size : l x b (cm ²)	23.88 X 30.36
24	Number of rachis per inflorescence	9.86
25	Flowering intensity (%)	76.21

Apple Characteristics:



26	Apple colour	Yellow
27	Apple shape	Pyriiform
28	Apple size : l x b (cm ²)	7.9 X 5.3
29	Apple weight (g)	94.2
30	Cavity	Shallow
31	Apple skin	Smooth & glowing
32	TSS (° B)	15.5

Nut & kernel characteristics, and yield:

33	Number of nuts per panicle	2.13
34	Average nut weight (g)	7.8
35	Nut length (cm)	3.77
36	Nut thickness (cm)	1.84
37	Nut width (cm)	2.54
38	Nut shell colour	Buff
39	Nut shape	Oblong-ellipsoidal
40	Flank of nut	Bulging
41	Specific gravity of nut	1.02
42	Shell thickness (mm)	3.28
43	Filling of shell	Full
44	Shelling (%)	27.63
45	Kernel weight (g)	2.1
46	Kernel grade	W240
47	Attachment of peel to kernel	Tight
48	Colour of testa	Brown
49	Nut yield /tree/year (kg)	9 – 10
50	Apple to nut ratio	11.7



Accession Number	G – CS – 6 – 13
Accession Name	Ashley-1
Village	Raia
Name of Zone:	Salcette (South Goa)

General Characteristics of mother tree:

1	Approximate age (Years)	10
2	Height of tree (m)	10.5
3	Tree habit	Upright & compact
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	11.5 x 10.2
6	Incidence of TMB & CSRB	Not affected

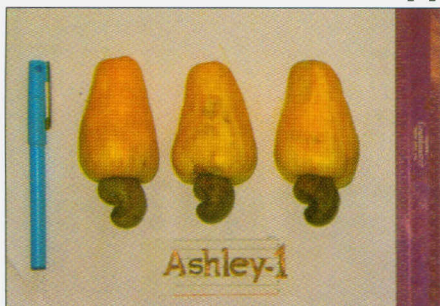
Leaf Characteristics :

7	Time of new flush	Starting of December
8	Colour of new leaves	Yellow green
9	Colour of mature leaves	Green
10	Number of leaves per twig	8.53
11	Leaf shape	Ovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	15.77 x 9.64
14	Brittleness of leaf	Brittle
15	Angle of leaf	Obtuse

Flowering and Flower characteristics:

16	Flowering Season	Mid season
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	65 (Medium)
23	Inflorescence size : l x b (cm ²)	26.63 X 27.58
24	Number of rachis per inflorescence	9.73
25	Flowering intensity (%)	60.41

Apple Characteristics:



26	Apple colour	Yellow
27	Apple shape	Pyriform
28	Apple size : l x b (cm ²)	8.92 x 5.01
29	Apple weight (g)	80.28
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.2

Nut & kernel characteristics, and yield:

33	Number of nuts per panicle	6.26
34	Average nut weight (g)	7.42
35	Nut length (cm)	3.16
36	Nut thickness (cm)	1.83
37	Nut width (cm)	2.63
38	Nut shell colour	Buff
39	Nut shape	Ellipsoid
40	Flank of nut	Bulging
41	Specific gravity of nut	0.99
42	Shell thickness (mm)	2.84
43	Filling of shell	Full
44	Shelling (%)	28.27
45	Kernel weight (g)	1.7 - 2.0
46	Kernel grade	W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	8 - 12
50	Apple to ratio	10.78



Accession Number	G – CS – 6 – 14
Accession Name	Raia - 1
Village	Raia
Name of Zone	Salcette (South Goa)

General Characteristics of mother tree:

1	Approximate age (Years)	10
2	Height of tree (m)	7.8
3	Tree habit	Upright & open
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	7.3 X 6.1
6	Incidence of TMB & CSRB	Not affected

Leaf Characteristics :

7	Time of new flush	End of November
8	Colour of new leaves	Yellow Red
9	Colour of mature leaves	Dark green
10	Number of leaves per twig	12.06
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	15.82 X 9.11
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:

16	Flowering Season	Mid
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	86 (Long)
23	Inflorescence size : l x b (cm ²)	24.82 x 27.14
24	Number of rachis per inflorescence	8.66
25	Flowering intensity (%)	73.63

Apple Characteristics:

26	Apple colour	Red
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	8.21 x 5.3
29	Apple weight (g)	91.33
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	11.3



Nut & kernel characteristics, and yield:

33	Number of nuts per panicle	3.8
34	Average nut weight (g)	10.74
35	Nut length (cm)	3.4
36	Nut thickness (cm)	1.96
37	Nut width (cm)	2.63
38	Nut shell colour	Buff
39	Nut shape	Kidney
40	Flank of nut	Bulging
41	Specific gravity of nut	1.03
42	Shell thickness (mm)	3.29
43	Filling of shell	Full
44	Shelling (%)	29.31
45	Kernel weight (g)	2.8 -3.1
46	Kernel grade	W180 – W210
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	11 – 12
50	Apple to nut ratio	9.1 (Medium)

Accession Number	GCC - 94/1
Accession Name	Ganje-1
Village	Ganje
Name of Zone:	Ponda (South Goa)

General Growth Characteristics of tree

1	Approximate age (Years)	12
2	Height of tree (m)	10.8
3	Tree habit	Upright and spreading
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	12.5 X 11.2
6	Incidence of TMB & CSRB	Affected by both

Leaf Characteristics :

7	Time of new flush	Starting of December
8	Colour of new leaves	Yellow red
9	Colour of mature leaves	Green
10	Number of leaves per twig	8.53
11	Leaf shape	Ovate
12	Leaf apex	rounded
13	Leaf size : L x B (cm ²)	15.77 x 9.64
14	Brittleness of leaf	Brittle
15	Angle of leaf	Acute

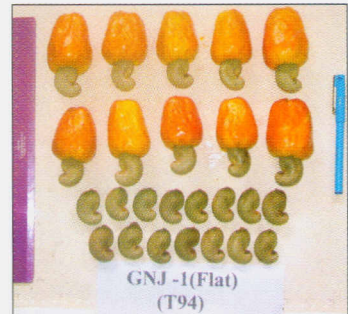


Flowering and Flower characteristics:

16	Flowering Season	Mid season
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	65-70 (Medium)
23	Inflorescence size : l x b (cm ²)	26.63 X 27.58
24	Number of rachis per inflorescence	9.73
25	Flowering intensity (%)	69.41

Apple Characteristics:

26	Apple colour	Red
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	6.5 x 4.5
29	Apple weight (g)	59.28
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.2



Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	3.2
34	Average nut weight (g)	8.42
35	Nut length (cm)	3.16
36	Nut thickness (cm)	1.83
37	Nut width (cm)	2.63
38	Nut shell colour	Buff
39	Nut shape	Ellipsoid
40	Flank of nut	Flattened
41	Specific gravity of nut	0.99
42	Shell thickness (mm)	2.84
43	Filling of shell	Full
44	Shelling (%)	27.27
45	Kernel weight (g)	1.7
46	Attachment of peel to kernel	Easy to remove
47	Colour of testa	Light brown
48	Approx. Nut yield /tree/year (kg)	10
50	Apple to nut ratio	7.02 (Low)

Accession Number	GCC - 94/2
Accession Name	Ganje - 2
Village	Ganjem
Name of Zone:	Ponda(North Goa)

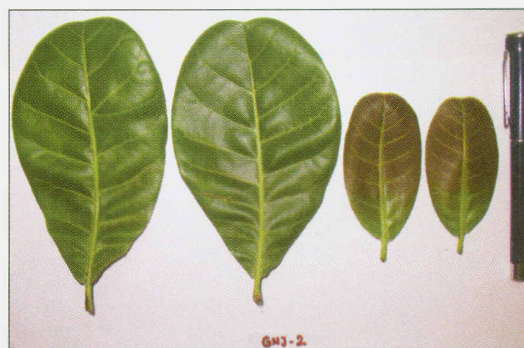
General growth Characteristics tree:



1	Approximate age (Years)	16
2	Height of tree (m)	12.8
3	Tree habit	Spreading
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	14.8 X 13.6
6	Reaction to TMB & CSRB	Not affected by both

Leaf Characteristics :

7	Time of new flush	October
8	Colour of new leaves	Yellow red
9	Colour of mature leaves	Green
10	Number of leaves per twig	10.5
11	Leaf shape	Obovate
12	Leaf apex	Indented
13	Leaf size : L x B (cm ²)	14.8 x 11.2
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:

16	Flowering Season	Mid season (Dec. Jan.)
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	70-80
23	Inflorescence size : l x b (cm ²)	20.4 X 21.6
24	Number of rachis per inflorescence	10.0
25	Flowering intensity (%)	80.23

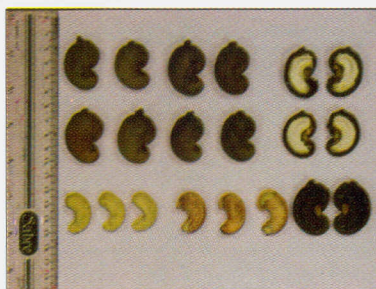


Apple Characteristics:

26	Apple colour	Yellow
27	Apple shape	Rounded
28	Apple size : l x b (cm ²)	7.1 X 6.1
29	Apple weight (g)	96.5
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	13.8

**Nut and kernel characteristics, and yield:**

33	Number of nuts per panicle	5.6
34	Average nut weight (g)	8.2
35	Nut length (cm)	3.38
36	Nut thickness (cm)	1.86
37	Nut width (cm)	2.48
38	Nut shell colour	Gray
39	Nut shape	Kidney
40	Flank of nut	Bulged
41	Specific gravity of nut	1.00
42	Shell thickness (mm)	3.5
43	Filling of shell	Full
44	Shelling (%)	29.5
45	Kernel weight (g)	2.38
46	Kernel grade	W210-W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	15 – 18
50	Apple to Nut ratio	11.76



Accession Number	G – CS – 1 – 2
Accession Name	Bardez – 2
Village	Madel
Name of Zone:	Bardez (North Goa)

General Characteristics of mother tree:

1	Approximate age (Years)	>10
2	Height of tree (m)	6.5
3	Tree habit	Upright & compact
4	Branching pattern	Intensive
5	Canopy Size: NS x EW (m ²)	6.7 X 7.1
6	Incidence of TMB & CSRB	Not affected By both pests

Leaf Characteristics:

7	Time of new flush	End of November
8	Colour of new leaves	Red
9	Colour of mature leaves	Green
10	Number of leaves per twig	12.0
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size: L x B (cm ²)	14.88 X 7.34
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute



Flowering and Flower characteristics:

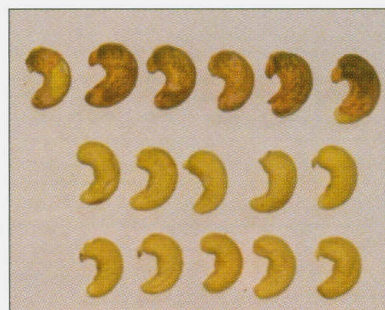
16	Flowering Season	Early
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	60- 87
23	Inflorescence size: l x b (cm ²)	17.99 X 19.48
24	Number of rachis per inflorescence	8.0
25	Flowering intensity (%)	75.83

Apple Characteristics:

26	Apple colour	Red
27	Apple shape	Conical Obovate
28	Apple size: l x b (cm ²)	4.88 X 4.22
29	Apple weight (g)	48.46
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (o B)	15.6

Nut and kernel characteristics, and yield:

33	Number of nuts per panicle	3.46
34	Average nut weight (g)	7.6
35	Nut length (cm)	2.92
36	Nut thickness (cm)	1.52
37	Nut width (cm)	2.28
38	Nut shell colour	Ash gray
39	Nut shape	Kidney
40	Flank of nut	Flattened
41	Specific gravity of nut	1.01
42	Shell thickness (mm)	2.64
43	Filling of shell	Full
44	Shelling (%)	30.36
45	Kernel weight (g)	1.77
46	Kernel grade	W320 –W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	10-15
50	Apple to nut ratio	6.37 (Medium)



Accession Number	G-CS-1-3
Accession Name	Bardez – 3
Village	Painowodo (Tivim)
Name of Zone:	Bardez (North Goa)

General growth Characteristics of tree

1	Age (Years)	8
2	Height of tree (m)	4.5
3	Tree habit	Upright and compact
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m ²)	4.8 X 4.4
6	Reaction to TMB & CSRB	Not affected by both pests

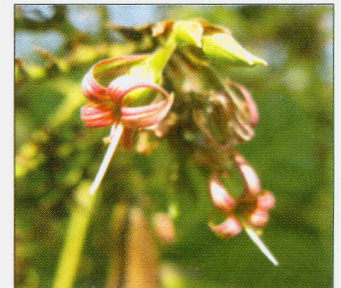
Leaf Characteristics :



7	Time of new flush	End of November
8	Colour of new leaves	Red
9	Colour of mature leaves	Dark green
10	Number of leaves per twig	11.93
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	18.8 X 9.56
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

Flowering and Flower characteristics:

16	Flowering Season	Early
17	Inflorescence Colour	Pink
18	Inflorescence shape	Broadly pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All round the axis
21	Flower colour	Pink
22	Flowering duration (days)	75 (Medium)
23	Inflorescence size: l x b (cm ²)	18.55 X 15.59
24	Number of rachis per inflorescence	7.8
25	Flowering intensity (%)	66.96



Apple Characteristics:

26	Apple colour	Yellow
27	Apple shape	Cylindrical
28	Apple size: l x b (cm ²)	6.77 X 5.28
29	Apple weight (g)	75.66
30	Cavity	Deep
31	Apple skin	Smooth and glowing
32	TSS (° B)	13.2

**Nut and kernel characteristics, and yield:**

33	Number of nuts per panicle	3.93
34	Average nut weight (g)	7.48
35	Nut length (cm)	3.6
36	Nut thickness (cm)	1.68
37	Nut width (cm)	2.31
38	Nut shell colour	Ash gray
39	Nut Shape	Kidney
40	Flank of nut	Bulged
41	Specific gravity	1.03
42	Shell thickness (mm)	2.86
43	Filling of shell	Full
44	Shelling (%)	27.59
45	Kernel weight (g)	2.0
46	Kernel grade	W320 – W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	9 -10
50	Apple to nut ratio	10.1

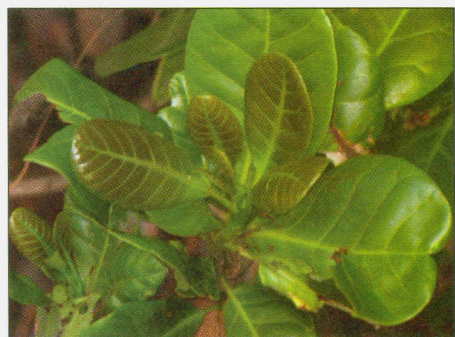
Accession Number	G-CS-1-12
Accession Name	Bardez – 8
Village	Painowodo (Tivim)
Name of Zone:	Bardez (North Goa)

General Characteristics of tree:

1	Age (Years)	8
2	Height of tree (m)	5.8
3	Tree habit	Upright and compact
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	9.7 X 10.2
6	Incidence of TMB & CSRB	Not affected by TMB & CSRB



Leaf Characteristics :



7	Time of new flush	End of October
8	Colour of new leaves	Yellow Green
9	Colour of mature leaves	Green
10	Number of leaves per twig	9.53
11	Leaf shape	Obovate
12	Leaf apex	Indented
13	Leaf size : L x B (cm ²)	13.24 x 12.62
14	Brittleness of leaf	Brittle
15	Angle of leaf	Acute

Flowering and Flower characteristics:

16	Flowering Season	Early
17	Inflorescence Colour	Pink
18	Inflorescence shape	Narrowly Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	58 (short)
23	Inflorescence size : l x b (cm ²)	20.22 x 19.78
24	Number of rachis per inflorescence	8.73
25	Flowering intensity (%)	70.79

Apple Characteristics:



26	Apple colour	Yellow
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	5.66 X 4.56
29	Apple weight (g)	62.4
30	Cavity	Shallow
31	Apple skin	Smooth and Glowing
32	TSS (° B)	13.6

Nut & kernel characteristics, and yield:

33	Number of nuts per panicle	2.6
34	Average nut weight (g)	7.44
35	Nut length (cm)	3.22
36	Nut thickness (cm)	2.03
37	Nut width (cm)	2.62
38	Nut shell colour	Buff
39	Nut shape	Kidney
40	Flank of nut	Bulging
41	Specific gravity of nut	1.02
42	Shell thickness (mm)	3.22
43	Filling of shell	Full
44	Shelling (%)	30.14
45	Kernel weight (g)	1.24 - 1.8
46	Kernel grade	W320 – W240
47	Attachment of peel to kernel	Tight
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	8 – 10
50	Apple to nut ratio	8.78 (Medium)

Accession Number	G-CS-1-9
Accession Name	Bardez – 9
Village	Porvorim
Name of Zone:	Bardez (North Goa)

General growth Characteristics of tree

1	Approximate age (Years)	8
2	Height of tree (m)	11.2
3	Tree habit	Upright and compact
4	Branching pattern	Intensive
5	Canopy Size : NS x EW (m ²)	5.4 X 5.5
6	Incidence of TMB & CSRB	Susceptible to TMB, not affected by CSRB

Leaf Characteristics :



7	Time of new flush	Mid November
8	Colour of new leaves	Red
9	Colour of mature leaves	Dark green
10	Number of leaves per twig	11.13
11	Leaf shape	Ovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	18.55 X 9.63
14	Brittleness of leaf	Leathery
15	Angle of leaf	Acute

Flowering and Flower characteristics:

16	Flowering Season	Mid season
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	52 (Short)
23	Inflorescence size : l x b (cm ²)	22.33 X 19.7
24	Number of rachis per inflorescence	7.66
25	Flowering intensity (%)	74.64



Apple Characteristics:

26	Apple colour	Yellow
27	Apple shape	Cylindrical
28	Apple size : l x b (cm ²)	8.8 x 6.5
29	Apple weight (g)	85.0
30	Cavity	Shallow
31	Apple skin	Smooth and Glowing
32	TSS (° B)	13.8

**Nut & kernel characteristics, and yield:**

33	Number of nuts per panicle	6.8
34	Average nut weight (g)	11.23
35	Nut length (cm)	3.15
36	Nut thickness (cm)	1.98
37	Nut width (cm)	2.38
38	Nut shell colour	Gray
39	Nut shape	Kidney
40	Flank of nut	Bulging
41	Specific gravity of nut	1.01
42	Shell thickness (mm)	3.01
43	Filling of shell	Full
44	Shelling (%)	27.5
45	Kernel weight (g)	3.51
46	Kernel grade	W210
47	Attachment of peel to kernel	Tight
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	8 - 10
50	Apple to Nut ratio	7.58



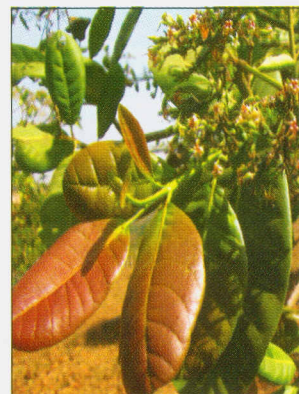
Accession Number	G-CS-2-5
Accession Name	Mayem –1
Village	Mayem
Name of Zone:	Bicholim (North Goa)

General Growth Characteristics of tree:

1	Approximate age (Years)	9
2	Height of tree (m)	6.2
3	Tree habit	Upright and spreadingt
4	Branching pattern	Extensive
5	Canopy Size : NS x EW (m2)	10.2 X 9.8
6	Incidence of TMB & CSRB	Not affected

Leaf Characteristics :

7	Time of new flush	Mid December
8	Colour of new leaves	Red
9	Colour of mature leaves	Green
10	Number of leaves per twig	12.8
11	Leaf shape	Obovate
12	Leaf apex	Rounded
13	Leaf size : L x B (cm ²)	19.25 X 9.8
14	Brittleness of leaf	Brittle
15	Angle of leaf	Acute



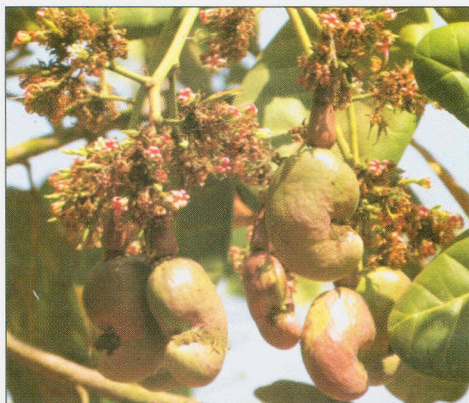
Flowering and Flower characteristics:



16	Flowering Season	Late
17	Inflorescence Colour	Pink
18	Inflorescence shape	Pyramidal
19	Compactness of Inflorescence	Loose
20	Inflorescence branching	All Round the Axis
21	Flower colour	Pink
22	Flowering duration (days)	60-65 (Short)
23	Inflorescence size : l x b (cm ²)	21.68 x 19.39
24	Number of rachis per inflorescence	8.13
25	Flowering intensity (%)	68.18

Apple Characteristics:

26	Apple colour	Red
27	Apple shape	Conical Obovate
28	Apple size : l x b (cm ²)	7.2 x 5.5
29	Apple weight (g)	70.0
30	Cavity	Deep
31	Apple skin	Smooth & glowing
32	TSS (° B)	12.8

**Nut and kernel characteristics, and yield:**

33	Number of nuts per panicle	2.0
34	Average nut weight (g)	8.89
35	Nut length (cm)	4.01
36	Nut thickness (cm)	1.78
37	Nut width (cm)	2.89
38	Nut shell colour	Buff
39	Nut shape	Kidney
40	Flank of nut	Flattened
41	Specific gravity of nut	1.03
42	Shell thickness (mm)	4.09
43	Filling of shell	Full
44	Shelling (%)	28.00
45	Kernel weight (g)	2.3
46	Kernel grade	W210 - W240
47	Attachment of peel to kernel	Easy to remove
48	Colour of testa	Light brown
49	Nut yield /tree/year (kg)	15
50	Apple to Nut ratio	7.95



Conclusion:

Efforts have been made to collect the promising cashew genotypes from among the seedling population of cashew plantations in Goa. A clonal germplasm bank is being maintained at ICAR Research Complex for Goa, Old Goa. This germplasm collection is having 14 bold nut types, 19 medium nut types, 14 medium nut and high yielding types and the remaining either high yielders or cluster bearing types. In the course of evaluation of germplasm accessions, all the genotypes were characterized and catalogued with passport data. Based on this data, the probable repeats of genotypes were avoided to achieve a true core collection of genotypes. This document is such a record to reflect the details of characteristics of the prominent genotypes to represent the broad variability existing in cashew plantations in Goa. The data generated would be aptly useful for designing appropriate crop improvement programmes in cashew to cater to the needs of future research programmes.

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- IBPGR. 1986. Cashew Descriptors. International Board for Plant Genetic Resources (Presently, International Plant Genetic Resources Institute), Rome. 33pp.
- Swamy KRM, EVV Bhaskara Rao and MG Bhat. 1998. Catalogue of Minimum Descriptors of Cashew Germplasm Accession - II, National Research Centre for Cashew.

