Coconut Cultivars and Hybrids

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CENTRAL PLANTATION CROPS RESEARCH INSTITUTE
(Indian Council of Agricultural Research)
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1. Chandrasankara (COD x WCT)
2. Lakshadweep Ordinary
3. Kerasankara (WCT x COD)

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COCONUT CULTIVARS AND HYBRIDS

The coconut (*Cocos nucifera* L.) is one of the most useful palms in the world which provides food, shelter and a number of industrial byproducts. The palm is grown in varying soil and climatic conditions. Though represented by a monotypic species, because of its predominantly cross pollinating nature, several types, widely differing from each other in the morphological characters exist. However, basically in coconut, there are two types viz., the talls and the dwarfs.

The tall cultivars are grown on plantation scale for copra, oil and fibre. They are generally identified by the location of cultivation or collection. They grow to a height of 15-18 m with 25-40 fronds on the crown. Their life span extends from 60-80 years or more. The tall cultivars are predominantly cross-pollinated and exhibit high degree of variability with respect to crown shape, colour, shape and size of fruits, copra and oil content. They come to bearing in about 6-7 years under favourable conditions and attain steady bearing in about 12-15 years after flowering. The nuts are generally medium to big in size with colours varying from green, greenish yellow and brown. The nuts have good quality and quantity of copra and fairly high oil content (68-70%).

The dwarf cultivars, as the name implies, are short in stature, growing to a height of 5-7 m with closely arranged leaf scars on their stem. The palms commence bearing in about 3-4 years after planting. They are short-lived with a life span of about 40-50 years. The dwarf palms are predominantly self-pollinated and hence the variability within a cultivar is comparatively less. However, they differ from each other in the production of bunches, yield of nuts and copra. The nuts of dwarf cultivars are smaller. Copra is soft and leathery with low oil content (65-67%) and therefore has little demand in the market. The dwarf cultivars are invariably known by the colour of their fruits viz., those producing green, yellow and orange fruits and location of collection/occurrence. Though dwarfs are grown for ornamental as well as tender nut purposes, their usefulness as parents in Dwarf x Tall and Tall x Dwarf crosses has been fully recognized and exploited by coconut breeders all over the world.

The practical identification of cultivars/ hybrids is very important for the growers as well as for the research workers. To make one familiar with common varieties of coconut, a brief account of the characteristic features of the promising cultivars as well as hybrids are given below:

TALL CULTIVARS

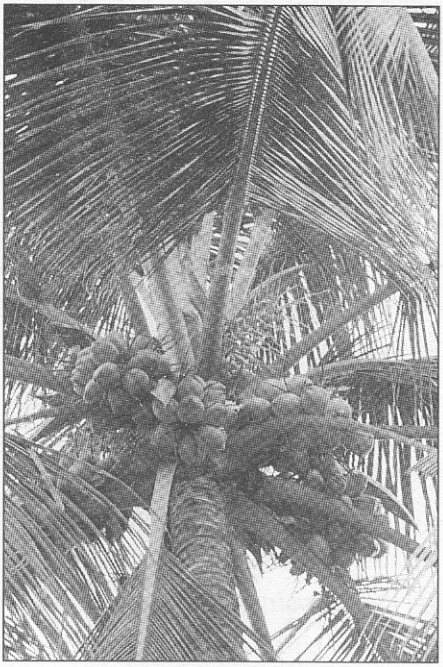
WEST COAST TALL (WCT) : Of the cultivars available in India, West Coast Tall (WCT), which is otherwise known as the ordinary or common tall variety, is the one that is

extensively cultivated in all the important tracts of the country. It is of commercial importance. This cultivar is in cultivation in the country from very ancient times and may therefore, be considered as indigenous to the country. It is majestic in appearance, sturdy and yields economically for about 75 years or more. A fully grown palm of 27-30 years of age has an average of 36 functional leaves, with spherical or semi-spherical crown and shows 80% regularity in bearing, producing 12-13 inflorescences per year. The WCT palms normally come to bearing in about 6-7 years under favourable conditions. The average annual yield under rainfed condition ranges from 40-100 nuts per palm with a mean of 80 nuts. It has a copra content of 176 g/nut, the range being 135-200g. About 5000 to 7400 nuts are required to make one tonne of copra. The oil content in copra is 68%. The oil of this cultivar contains 44.1% lauric acid and high saponification value (252.1). Hence it can be preferred for both edible purpose and soap manufacture. The husk of WCT is of good quality extensively used for making coir and coir products. The palms also yield good quality and quantity of juice or toddy, which is fermented or converted into jaggery or sugar. The WCT palm grows well in all types of soil and is somewhat tolerant to moisture stress in the soil. Hence it is recommended for large scale cultivation in coastal regions of Kerala and Karnataka.

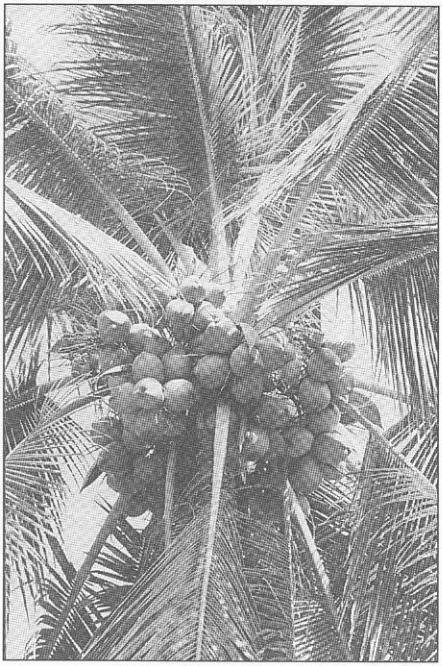
KAPPADAM TALL (KPDT) : This cultivar resembles the ordinary tall type, but it is more robust in characters particularly in size of the nut which is one of the largest on record. The shape of the nut is broadly ellipsoid. The yield is rather low being about 77 nuts, the range being 62-99 nuts/palm/year. The quantity of copra is high i.e. 284 g/nut and the copra is thick and hard. The oil content in copra is 67%. This cultivar is grown in parts of South Malabar. About 3520 nuts are required to make one tonne of copra. This cultivar is also known as 'Chappadan' in some parts of Kerala.

EAST COAST TALL (ECT) : This is a common cultivar grown extensively on the East Coast of India. It resembles WCT in gross morphology. The palms take about 6-8 years to commence flowering. The average annual yield is 70 nuts per palm with a range of 40-120 nuts. The nuts are smaller than those of WCT. The copra content varies from 100-140 g/nut with a mean of 125 g/nut. It has an oil content of 64%. To make one tonne of copra, 7000-10000 nuts are required.

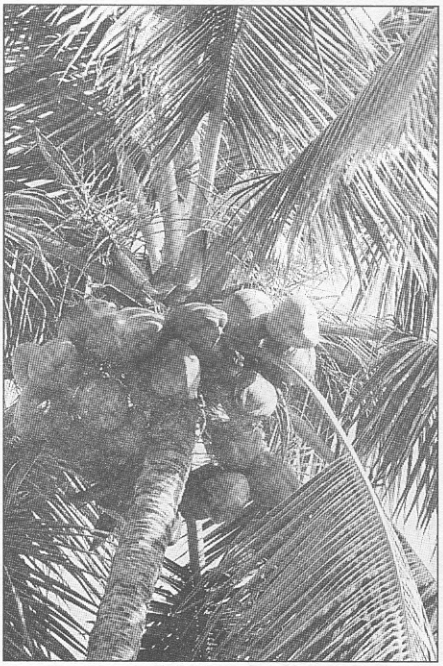
TIPTUR TALL (TPT) : This is a popular cultivar of Karnataka State. The palms resemble WCT in most of the morphological characters. The colour of the nuts varies from green, greenish yellow to brown. The palms take about 6-7 years for flowering. The size of the nut is round or oval and the average yield of nuts/palm is 86, the range being 70-110 nuts. The mean copra content is 178 g/nut. Approximately 4780-6800 nuts are required to make one tonne of copra. The oil content in copra is 68%.



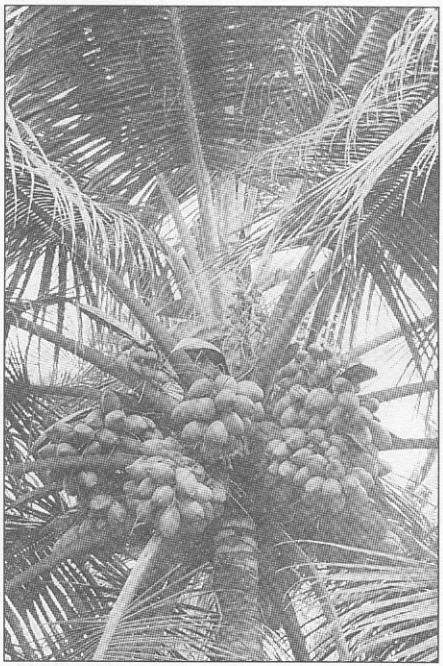
BENAULIM (PRATAP)



PHILIPPINES ORDINARY



KAPPADAM



LAKSHADWEEP MICRO

COMPARATIVE PERFORMANCE OF TALL CULTIVARS

Cultivar	Time taken for flowering (months)	Shape of nut	Nut yield (kg/palm/ year)	Copra content/ nut(g)	Copra yield (kg/palm/ year)	Oil content (%)
West Coast Tall (WCT)	72-84	Oval	80	176	14.0	68
Kappadam (KPDT)	72-84	Oval	77	284	21.8	67
East Coast Tall (ECT)	72-96	Oval	70	125	8.7	64
Tiptur Tall (TPT)	72-84	Oval	86	178	15.3	68
Benaulim Tall (BENT) 'Pratap'	84-96	Round	150	152	22.8	64
Lakshadweep Ordinary (LCT) 'Chandrakalpa'	60-72	Oval with prominent ridges	100	176	17.6	72
Lakshadweep Micro (LMT)	96-108	Round to oblong	200	90	18.0	75
Andaman Ordinary (ADOT)	72-96	Oval	94	169	15.9	66
Philippines Ordinary (PHOT)	60	Round	110	198	21.8	66
San Ramon (SNRT)	72-96	Oval	64	350	22.4	68
Cochin China (CCT)	72-84	Round	98	220	21.6	66
Fiji Tall (FJT)	60-72	Oval	100	200	20.0	65

BENAULIM TALL (BENT) : This is a popular cultivar of Goa, Konkan and Coastal Maharashtra. The palm resembles WCT in appearance, but the nuts are smaller and round. This cultivar normally comes to bearing in about 7-8 years. The bunches are heavy and attractive with closely packed round nuts. The average annual yield of nuts is 150 with a range of 139 to 160 nuts per palm. It has a mean copra content of 152 g/nut with a range of 120 to 160 g. The oil content in copra is 64%. The oil of this cultivar has high concentration of myristic acid ie., 22.5%. The oil is more suitable for industrial uses for the manufacture of binder, emolluent and cosmetics. This cultivar was released in 1987 by the Konkan Krishi Vidhyapeeth, Dapoli, Maharashtra under the name 'Pratap' for commercial cultivation in Maharashtra State.

LAKSHADWEEP ORDINARY (LCT) : This indigenous cultivar from Lakshadweep Islands resembles WCT in growth habit and the nut characters except for the comparatively smaller nut with three prominent ridges seen on the triangular nut. The nut colours vary from green to yellow through various shades of brown. The average annual yield is 100 nuts with a range of 80-178 nuts/palm. It has a copra content of 176 g/nut with 72% oil content. The oil of this cultivar contains high concentration of medium chain fatty acids which is preferred for edible purposes. It is also preferred for pharmaceutical industries, as the oil contains high saturated fatty acid (92.5%) with high lauric acid concentration (48.9%). These palms are considered good for tapping sweet toddy. About 5600 to 7000 nuts are required to make one tonne of copra. The palm grows in all types of soil and it can withstand moisture stress. This cultivar was released by CPCRI, Kasaragod during 1985 under the name 'Chandrakalpa' for large scale cultivation in the states of Kerala, Karnataka, Andhra Pradesh and Maharashtra.

LAKSHADWEEP MICRO (LMT) : This cultivar is another introduction from Lakshadweep Island. This is a profuse bearing tall palm and resembles WCT in morphological characters. As the name indicates, the nuts are very small in size. The nut colour varies from green to shades of brown. The bunches are heavy with large number of small and closely packed nuts. The annual average yield of the palm is 200 nuts with a range of 100 to 320. The copra content in this cultivar is 80 to 100 g/nut with 75% oil, the highest recorded among the cultivars. The cultivar is best suited for the production of 'ball copra'. This palm exhibits alternate bearing tendency. Barren nut production is usually associated with this cultivar. About 10,000 to 13,000 nuts are required to make one tonne of copra.

ANDAMAN ORDINARY (ADOT) : This cultivar is largely grown in Andaman & Nicobar Islands. The palms are tall, massive and comparatively more vigorous than WCT

palms in vegetative growth. The nuts are fairly large in size with an average yield of 94 nuts/palm/year. The copra content is 169 g/nut and nearly 5900 nuts are required to make one tonne of copra. The oil content in copra is 66%. The oil of this cultivar contains high concentration of medium chain fatty acids (64.7%) which is suitable for curing diet absorption disorder. The oil is more suited for soap and pharmaceutical industries as it contains high saturated fatty acid (93.3%) with high lauric acid concentration (49%). This cultivar is used as a female parent in the production of the hybrid 'Anandaganga'.

PHILIPPINES ORDINARY (PHOT) : This exotic cultivar from the Philippines grows to a height of 10-12 m. It is a good yielder and the annual yield of nuts varies from 90 to 200 with an average of 110 nuts/palm. The mean copra content is 198 g/nut with 66% oil in copra. Because of the high concentration of saturated fatty acids (90.5%) and high saponification value (262.1), the oil of this cultivar is more suitable for soap industry. Because of its high yield potential, this cultivar was released by CPCRI as a 'National variety' during 1995 for commercial cultivation in the west coast including Konkan Region, coastal Andhra Pradesh and West Bengal.

SAN RAMON (SNRT) : This is a cultivar from the Philippines which is gigantic in appearance. It takes about 6-8 years for flowering. The palm produces about 55-95 nuts with large size nearly twice as large as the West Coast Tall variety. This is perhaps the largest nut ever-known on a plantation scale. The copra content is 350 g/nut with 68% oil. About 2860 nuts are required to produce one tonne of copra. This cultivar is also found in several countries in South Asia, South-East Asia and the Pacific.

COCHIN CHINA (CCT) : This tall cultivar was introduced from Cochin China. It takes about 6-7 years for flowering. The palms are tall and bear about 98 nuts with a range of 65 to 150 nuts. The nuts are large, oval in shape and greenish yellow in colour. The copra is of good quality and weighs about 220 g/nut and has an oil content of 66%.

FIJI TALL (FJT) : This type from Fiji Islands resembles the ordinary tall type of west coast of India. The palm flowers in about 5-6 years after planting. It is a high yielder and produces more than 100-120 nuts/palm/year. The nuts are oval in shape and greenish yellow in colour. The copra content per nut is also high with 200 g/nut with an oil content of 65%. Fiji Tall can be cultivated on commercial scale due its high nut yield as well as copra yield.

DWARF CULTIVARS

CHOWGHAT ORANGE DWARF (COD) : This indigenous cultivar is found sparsely cultivated throughout the west coast region of India, particularly in the Chavakkad area of Thrissur district of Kerala. The palm has a thin stem with closely arranged leaf scars, a small compact crown with characteristic

orange colour on leaf petioles, inflorescences and nuts. This is an early flowering cultivar and takes about 3-4 years for initial flowering. The average annual yield is 65 nuts/palm with a range of 50-120 nuts. It has a mean copra content of 150 g/nut and 66% oil. The cultivar is also known as 'Gowrigathram' or 'Chenthengu' and 'Kenthali' in Kerala and Karnataka respectively. This is largely a self-pollinating cultivar. Traditionally this cultivar is being grown as an ornamental palm. Chowghat Orange Dwarf is best suited for tender nut water. The tender nut water of 7 - month old nut is sweet with a total sugar content of 7.0 g/100 ml. Sodium and potassium contents in tendernut water are 20 and 2000 ppm respectively. This cultivar was released by CPCRI in 1991 for large scale cultivation in the states of Kerala and Karnataka as tender nut variety. COD has also been planted in isolated blocks in the seed gardens in Kerala, Karnataka and Tamil Nadu for the production of Dwarf x Tall hybrids.

CHOWGHAT GREEN DWARF (CGD) : This indigenous cultivar was also reported from the Chavakkad area of Thrissur district in Kerala. This is the earliest flowering cultivar and takes about 2.5 to 3 years for flowering. The first inflorescence emerges from the 18th leaf axil and hence popularly known as 'Pathinettampattai' in Kerala as well as in Tamil Nadu. The leaf petioles, leaves and nuts are dark green in colour. The nuts have the characteristic 'beak' when fully mature. Retention of unfertilized female flowers and distribution of large number of female flowers per spike are the characteristic features associated with this cultivar. These palms have been found to have a good degree of field tolerance to root (wilt) disease and hence healthy palms located in the root (wilt) 'hotspots', have been extensively used in breeding for disease tolerance in combinations with disease resistant WCT palms occurring in similar areas. The mean annual yield of CGD palm is 66 nuts/palm with a range of 30 to 107 nuts. The copra content is low with a mean of 60 g/nut and 66% oil. The copra is of poor quality as it is leathery and has no demand in the market. The tender nut water is sweet, but the quantity is low (approx. 80 ml/nut). This cultivar exhibits alternate bearing habit.

GANGABONDAM GREEN DWARF (GBGD) : This is a dwarf green cultivar mainly grown in the East Godavari district of Andhra Pradesh and this cultivar is extensively used for tender nut water in this area. The palm exhibits dwarfish characters like short and narrow stem with closely arranged leaflets and compressed internodes. This cultivar has distinct and characteristic papaya-shaped green nuts. The palms are highly self-pollinated. They start bearing by 3rd to 4th year of planting. The mean annual yield is 67 nuts/palm with a range of 50 to 90 nuts. The copra content is 153 g with 67% oil. Because of its good combining ability, Gangabondam Green Dwarf is being used as

COMPARATIVE PERFORMANCE OF DWARF CULTIVARS

Cultivar	Time taken for flowering (months)	Shape of nut	Nut yield (kg/palm/ year)	Copra content/ nut(g)	Copra yield (kg/palm/ year)	Oil content (%)
Chowghat Orange Dwarf (COD)	36-48	Round	65	150	9.7	66
Chowghat Green Dwarf (CGD)	36	Oblong with a prominent beak	66	60	4.0	66
Gangabondam Green Dwarf (GBGD)	36-48	Oblong and papaya shaped	67	153	10.2	67
Malayan Yellow Dwarf (MYD)	48	Round	66	140	9.2	66
Malayan Orange Dwarf (MOD)	36-48	Oval	65	185	12.0	66
Malayan Green Dwarf (MGD)	74	Oval	120	167	20.6	67

a male parent in the production of Tall x Dwarf hybrids like Lakshaganga (LCT x GBGD), Keraganga (WCT x GBGD) and Anandaganga (ADOT x GBGD).

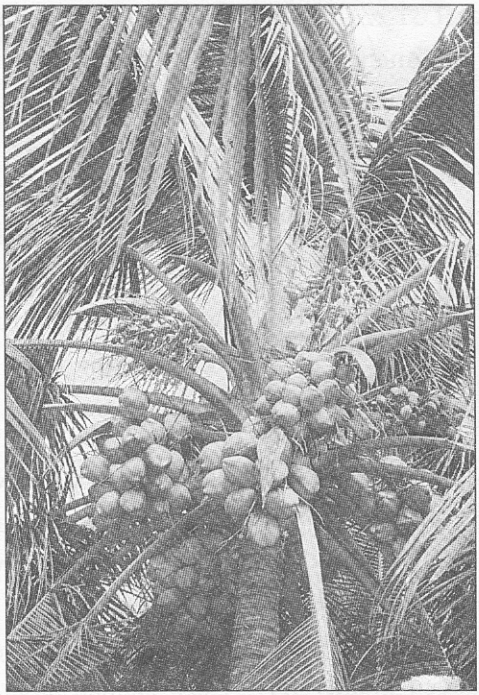
MALAYAN YELLOW DWARF (MYD) : This is a dwarf cultivar introduced from Malaysia. The leaf petioles, inflorescences and nuts of this cultivar are yellow in colour. It comes to bearing in about 4 years after planting. The mean annual yield is 66 nuts/palm with a range of 35 to 90. The average copra content per nut is 140 g. The oil content in copra is 66%. In India, a large scale introduction of MYD was done in 1985 at the Seed Garden Complex, Munderi Farm, Nilambur, Kerala for utilizing it as a parental material in producing hybrids. MYD was introduced mainly for hybrid seed production and is more homogenous than other dwarfs. Kerala Agricultural University has released a hybrid namely Kerasree for commercial cultivation, in which the male parent is MYD, while WCT is the female parent.

MALAYAN ORANGE DWARF (MOD) : This cultivar is popularly known as Malayan Red Dwarf (MRD) which has been introduced to most of the coconut growing countries in the world. The palms are very attractive with dark orange colour of nuts, spadices and leaf petioles. The palm resembles the indigenous Chowghat Orange Dwarf except that the leaf tips of inner whorl in MOD has a characteristic bending. The shape of nuts of MOD is ovoid, while that of COD is almost round. The palm comes to bearing in about 3-4 years after planting. The palm gives a mean annual yield of 65 nuts with a range of 50-100 nuts. The copra content is 185 g/nut with 66% oil. This cultivar is mostly cultivated for ornamental purpose. However in countries like Ivory Coast, MOD is being widely used for the production of hybrids. Recently, TNAU has released a hybrid namely VHC - 3 in which MOD is the male parent, while ECT is the female parent.

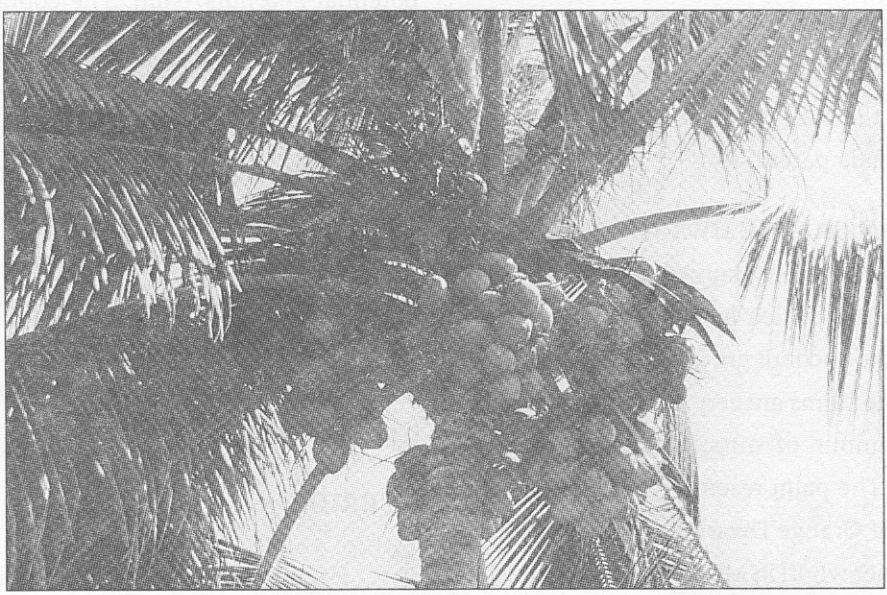
MALAYAN GREEN DWARF (MGD) : This is a semi-tall cultivar, eventhough the name indicates a dwarf type. This cultivar was also introduced from Malaysia. It is an early bearing type and produces medium sized and oval shaped green nuts. The mean annual yield is 120 nuts with a maximum yield potential 280 nuts/palm. The copra content is 167 g and oil content in copra is 67%. Since copra of this dwarf cultivar is of good quality and high yield is obtained under irrigation, this can be cultivated in our country as an economical type. Eventhough this cultivar gives higher yield, it shows a distinct alternate bearing habit which is the characteristic of typical dwarf palm. This cultivar exhibits greater heterozygosity than the other two types viz., yellow and orange.

HYBRIDS

Hybrids are the intervarietal crosses between the two morphological forms of coconut. They exhibit earliness in flowering,



CHANDRALAKSHA
(LCT X COD)



LAKSHAGANGA
(LCT X GBGD)

increased nut yield, higher copra production and give better quality copra and oil as compared to the parents. The first coconut hybrid in the world was produced in India in 1934 by Dr. J.S. Patel with West Coast Tall as female parent and Chowghat Green Dwarf as male parent.

Hybrids are produced in two ways, with tall as female parent and dwarf as male parent (Tall x Dwarf) or dwarf as female parent and tall as male parent (Dwarf x Tall). Besides intervarietal hybrids like Tall x Tall and Dwarf x Dwarf are also produced.

CHANDRASANKARA (COD X WCT) : This is the most popular Dwarf x Tall hybrid with COD as female parent and WCT as male parent. This hybrid can be easily identified in the nursery as the seedlings exhibit vigorous growth with bronze coloured petioles. The palms come to bearing early when compared to tall palms. It is a heavy yielder and produces 116 nuts/palm with a range of 100-150 nuts. The nuts are round to oblong in shape and bronze coloured. The copra content in nut is 215 g with a range of 160-230 g. The oil content in copra is 68%. The oil of this hybrid has high lauric acid concentration (47.1%) and low ratio of saturated to unsaturated fatty acids (7.77) with high level of medium chain fatty acids (62.7%). Hence the oil is highly suitable for edible purpose. It can also be used in dye, cosmetics and pharmaceutical industry. The hybrid performs better under good management conditions. However, it is susceptible to drought and hence irrigation is required during summer months. Chandrasankara was released by CPCRI in 1985 for general cultivation in Kerala and Karnataka.

KERASANKARA (WCT X COD) : This is a popular Tall x Dwarf hybrid between West Coast Tall as female parent and Chowghat Orange Dwarf as male parent. The hybrid palms are precocious and exhibit higher productivity than the parents. The palm comes to bearing by the fourth year of planting. The mean annual yield of nuts is 108 with a range of 70-130 nuts. The copra content is 187g/ nut with 68% oil. The oil of this hybrid is highly suited for edible purpose as it contains low ratio of saturated and unsaturated fatty acids (8.1%) with high level of medium chain fatty acids. This hybrid was released by CPCRI in 1991, for large scale cultivation in Kerala, coastal Andhra Pradesh and coastal Maharashtra.

CHANDRALAKSHA (LCT X COD) : This is a Tall x Dwarf hybrid between Lakshadweep Ordinary as female parent and Chowghat Orange Dwarf as male parent. The hybrid palm comes to bearing in about 4-5 years after planting. The mean annual yield is 109 nuts/ palm with a copra content of 195 g/nut, the range being 150-210g. The oil content is 69%. The oil of this hybrid is preferred for edible purpose as it contains high concentration of medium chain fatty acids with high lauric acid content (47.9%). It contains low ratio of

COMPARATIVE PERFORMANCE OF HYBRIDS

Hybrid	Time taken for flowering (months)	Shape of nut	Nut yield (kg/palm/ year)	Copra content/ nut(g)	Copra yield (kg/palm/ year)	Oil content (%)
Chandrasankara (COD x WCT)	36-48	Round	116	215	24.9	68
Kerasankara (WCT x COD)	48	Oval to round	108	187	20.2	68
Chandralaksha (LCT x COD)	48-60	Oval	109	195	21.3	69
Lakshaganga (LCT x GBGD)	60	Oval to round	108	195	21.1	70
Keraganga (WCT x GBGD)	48-60	Oval	100	201	20.1	69
Anandaganga (ADOT x GBGD)	60	Oval	95	216	20.5	68
Kerasree (WCT x MYD)	60	Oval	130	216	28.0	66
Kerasowbhagya (WCT x SSAT)	60	Oval	116	196	22.7	65
VHC - 1 (ECT x DG)	48	Oval	98	135	13.2	70
VHC -2 (ECT x MYD)	48	Oval	107	152	16.3	69
VHC - 3 (ECT x MOD)	48	Oval	127	162	20.5	70
Godavariganga (ECT x GBGD)	48-60	Oval	140	150	21.0	68

saturated and unsaturated fatty acids (8.2%). Oil can be used for dye, cosmetics and pharmaceutical industry. Chandralaksha performs better than Chandrasankara and Kerasankara under moisture stress situation. This hybrid has been released by CPCRI during 1985 for large scale cultivation in Kerala, Karnataka and Tamil Nadu.

LAKSHAGANGA (LCT X GBGD) : This is another Tall x Dwarf hybrid between Lakshadweep Ordinary as female parent and Gangabondam Green Dwarf as male parent. It comes to bearing in about 5 years. The mean annual yield is 108 nuts, the range being 90-135 nuts. The nuts are round to oblong in shape and have mean copra content of 195 g/nut with a range of 165-200 g. The oil content in copra is 70%. The oil of this cultivar is preferred for both edible and industrial purposes because of high lauric acid concentration (48.2%) and low ratio of saturated and unsaturated fatty acids and high concentration of medium chain fatty acids. This is yet another drought tolerant hybrid and can grow well even under rainfed condition. This hybrid was released by Kerala Agricultural University (KAU) during 1987 for large scale cultivation in Kerala.

KERAGANGA (WCT X GBGD) : This is a hybrid between West Coast Tall as female parent and Gangabondam Green Dwarf as male parent. This hybrid comes to bearing in about 4-5 years after planting. The mean annual yield is 100 nuts/palm with a yield potential of 220 nuts/palm. It has a copra content of 201 g/nut and 69% oil in the copra. Keraganga was also released by KAU in 1988 for commercial cultivation in Kerala.

ANANDAGANGA (ADOT X GBGD) : This is a Tall x Dwarf hybrid between Andaman Ordinary and Gangabondam Green Dwarf. The palms are tall in stature and produce around 95 nuts/palm/year with a yield potential of 240 nuts/palm. The hybrid palm flowers in about 5 years of planting. The mean copra content in the nut is 216 g with 68% oil content.

KERASREE (WCT X MYD) : This is yet another hybrid released by KAU in 1992 for cultivation in Kerala state. The parents of this hybrid are West Coast Tall (female) and Malayan Yellow Dwarf (male). The palm takes about 5 years for flowering. It is a heavy yielder with mean annual yield of 130 nuts/palm. The nuts are medium in size with light green colour. The mean copra content in the nut is 216g with 66% oil.

KERASOWBHAGYA (WCT X SSAT) : This hybrid is a cross between West Coast Tall as female parent and Strait Settlement Apricot Tall (SSAT) as male parent. The palm comes to bearing in about 5 years after planting. The mean annual yield is 116 nuts/palm. The copra content is 196 g with 65% oil. The hybrid was released by KAU during 1993 for large scale cultivation in Kerala State.

VHC-1 (ECT X DG) : This is a hybrid between

East Coast Tall (ECT) and Green Dwarf, released by Tamil Nadu Agricultural University (TNAU) in 1982 under the name 'Veppankulam Hybrid Combination -1' (VHC -1) for general cultivation in Tamil Nadu. The hybrid has early bearing habit and comes to bearing in about 4 years after planting. The mean annual yield of nut is 98 with a range of 80-145 nuts/palm. The copra content is 135 g and oil content in copra is 70%. The bunches have a tendency for buckling which is to be prevented by providing support.

VHC-2 (ECT X MYD) : This hybrid was also released by TNAU during 1987. The female parent in this hybrid is East Coast Tall and male parent is Malayan Yellow Dwarf. This hybrid flowers in about 4 years after planting. The hybrid palm gives around 107 nuts/palm, the range being 70-120 nuts. The nuts are medium in size and oval in shape. The copra content per nut is 152 g with 69% oil.

VHC-3 (ECT X MOD) : In this hybrid, East Coast Tall is the female parent and Malayan Orange Dwarf is the male parent. It takes about 4 years for the initial flowering. This hybrid is superior to VHC 1 and VHC 2 in nut yield. The hybrid gives an average yield of 127 nuts/palm/year with a yield potential of 157 nuts/palm. The copra content is 162 g/nut with 70% oil. This hybrid has been released during January 2000, by TNAU for cultivation in Tamil Nadu.

GODAVARIGANGA (ECT X GBGD) : This is a hybrid between East Coast Tall as female parent and Gangabondam Green Dwarf as male parent. The palm comes to bearing in 4-5 years after planting. This hybrid is a high yielder with an average yield of 140 nuts/palm/year. The copra content is 150 g/nut with 68% oil. Godavariganga was released by Andhra Pradesh Agricultural University (APAU) for general cultivation in Andhra Pradesh.

Performance of coconut cultivars and hybrids will vary depending on irrigation, soil, climate and the level of management. Farmers may choose the appropriate type to suit their farming situation for ensuring maximum returns from coconut cultivation.