



Rayat Shikshan Sanstha's
D. P. Bhosale College, Koregaon
Department of Botany
2023 - 24

Wallpaper on the Occasion of World Coconut Day

Coconut and its By-products

01 September 2023

President:

Hon. Prin. Dr. B. S. Chavan

Chief Guest :

Dr. B. M. Yadgirwar

Chairman:

Dr. Devanand Sontakke

Head of the Department:

Dr. S. M. Deshpande

Members:

Dr. P. P. Kamble

Mr. S. V. Thigale

Mrs. S. S. Shinde

Mr. P. S. Rasal

Mr. N. M. Kurle

Student:

Mr. Uday Mane

Mr. Samadhan Gaikwad



Coconut

Botanical name: *Cocos nucifera*

Family: Palmae

Origin: Indo-Malayan Region (South East Asia)

History, origin and Distribution -

Martius (1850) and Cook (1901) considered the West Coast of Central America as the centre of origin of coconut. On the other hand, de Candolle (1886) considered coconut to be of Asiatic origin. There are a lot of controversies pertaining to the origin of coconut. Whichever the place of origin of coconut, it is presently disseminated throughout the tropics. Coconut fossils have been discovered in India, New Zealand, Australia and South America, representing different continents of ancient Gondwana, except Africa and Antarctica. Since coconut has a thick husk, which allows it to float on water for long distances, it could have been disseminated through seawater ensuring wide spread. Apart from this, migration of people from one place to other even as early as 1000 BC could also have caused its dissemination to wider areas. During 16th century, European explorers had taken coconuts to West Africa, the Caribbean and America. Much of these assumptions are now supported by studies on the genetic structure of coconut populations as assayed through molecular markers. Gunn et al. (2011), utilizing data from molecular studies, have proposed independent origins of coconut cultivation in Pacific and Indian Ocean basins.

Botany -

Coconut (*Cocos nucifera* L.) is a monocotyledonous palm belonging to the family Arecaceae. It has only a single species '*nucifera*' in the genus *Cocos*, with the chromosome number of $2n=32$. The palms have a robust, cylindrical, erect stem with a single growing point from where the successive leaf production takes place producing a terminal crown. Palms can grow up to 20-30 meters in tall varieties and 10-15 meters in dwarf varieties. Leaves are pinnate and are called 'fronds', which are generally 4 to 6 m in length and 1.5 to 2 m in width. Leaves have a strong rachis to which the leaflets are attached on both sides. Canopy of coconut ('crown') consists of 28 to 36 fronds at the tip of the stem arranged in circular or semi circular shape. The inflorescence of coconut emerges from the axial of each frond every month. Inflorescence is protandrous. Unopened inflorescence looks like a

spadix within a spathe. It takes 44 months from inflorescence primordial initiation to nut maturity. In the 'spadix', the pistillate flowers and staminate flowers are attached to spike like rachillae. As many as 200 to 300 male flowers and only one or a few female flowers are attached to these rachillae. Male flowers are found 1 to 3 together, sessile and pale yellow in colour with three small sepals, three larger petals and six stamens in two whorls. Female flower is solitary, larger than male flowers in size, globose in bud, enveloped by two small scaly bracteoles, three sepals and three petals, ovoid at anthesis, sub-oricularm sub-equal, persistent and enlarging in fruit, pistil with large trilocular ovary, three sessile triangular stigmas and three nectaries near the ovary base. Within two to three weeks after the spadix opens, pollination takes place. Coconut is mainly a cross pollinated crop. But the 'dwarf' type coconuts are predominantly self-pollinated. It takes 12 months from pollination for a pistillate flower to develop in to mature nut. Fruit is a globose, ovoid or ellipsoidal fibrous drupe. Tender coconuts are generally 7 to 8 months old. Fruit (nut) has an outer greenish pericarp, fibrous middle mesocarp and hard endocarp (shell). Inside the endocarp, the fruit consists mainly of solid, white endosperm (kernel), liquid endosperm (nut water) and a single embryo. Coconut has an adventitious root system, which goes to the depth of 1.5 to 2 meters but with a horizontal spread of 4 to 5 meters. Decayed roots are replaced regularly due to the formation of new roots. Dwarf palms have a productive life span of 40-50 years. On the other hand, Tall type palms can survive for 80-100 years and can give economically profitable yields for more than 60 years.

Propogation -

Coconuts are propagated solely by seed. The seed nut has no dormancy and requires no special treatment to germinate. However, germination speed of seed nuts varies within and among ecotypes and varieties. Some Tall varieties (e.g., Malayan Talls) germinate while still on the palm, while others like the West African Tall and most Pacific populations take up to 6 weeks. Clonal propagation of such a genetically variable species would have obvious advantages. Since the plant does not multiply vegetatively (only very rarely does it produce vegetative shoots), attempts at clonal propagation through tissue culture have so far met with limited success. Embryo culture is employed in country-to-country exchange of planting material for breeding purposes.

Uses and Products -

A. Staple Food -

Coconut cream is obtained by squeezing the grated kernel. It is used in cooking with taro, bananas, fish, etc., in the Pacific islands and with rice in Indonesia and Malaysia. In India, various dishes are made using Coconut like coconut rice, chutney, sheera, barfi, raita, etc

B. Honey -

Honey Bees are the main pollinators for coconuts, which produce copious quantities of flowers nearly continually. Coconut honey is of exceptional quality.

C. Sweetener -

Fresh sap from the inflorescence obtained in the same way as for toddy is boiled down to produce palm sugar ("jaggery") that is popular in India, Sri Lanka, Vietnam, Indonesia, and Malaysia but not in the Pacific islands.

D. Timber -

The old stems are used for fence posts, poles, sawn timber, roofing shingles, and furniture. Treatment with chromated copper arsenate is necessary to prolong life, especially if used outdoors. It has become a specialty wood especially for furniture and flooring, but it is economically viable only if large scale plantings are available to provide an adequate source of old stems, e.g., in the Philippines, Solomon Islands, Samoa, and Vanuatu.

E. Fuel wood -

The shell is used dried or converted to shell charcoal for cooking or drying of kernels. Husks, spathes, empty bunch stalks and petioles virtually all plant parts can also be burned.

F. Craft wood/tools -

The trunk and shells are fashioned into carvings, kitchen utensils, and axe handles. In Hawaii, the base of the trunk has been used to make food containers and hula drums. In the Cook Islands, the hollowed-out trunk is used as a container in which "bush beer" is fermented.

G. Fiber/weaving/clothing -

Mature green fronds are woven into baskets, hats, mats, thatch, trays, fans, aquatic barriers, and all manner of plaited ware. The young leaves from a germinating nut are flexible and are used to make a foot harness tied between the feet for climbing coconuts. The unfurled immature leaves are used for making skirts, body ornamentation, and baskets.

H. Rope/cordage/string

Coir is the fiber obtained from the husk. The longest and finest fibers are spun into ropes, cordage, strings, and mats, while the thicker and shorter fibers are used in making brushes and as stuffing for seats and cushions.

I. Wrapping/parcelization -

Green fronds are woven into all sizes of baskets for carrying food and other goods. In Indonesia and Malaysia, fronds are woven into little baskets in which rice is cooked.

J. Thatch/roofing/mats -

Mature green fronds are commonly used as thatch for village dwellings in the Pacific islands. Coir is used for making door mats. Midribs are stripped from the lamina and bundled to form a broom.

K. Body ornamentation/garlands

The nut shells are fashioned into earrings, brooches, necklaces, and buttons.

L. Tannin/dye

When traditional colorants for tapa cloth are mixed with coconut oil, the colors are deeper and longer lasting. The charred husk is used to make a black dye in Tokelau.

M. Fragrance

In Hawaii, the male flowers were heated in coconut oil to perfume tapa cloth. The bark is used to scent body oil.

N. Cosmetic/soap/perfume

Oil, often scented with blossoms of the Tahitian gardenia (*Gardenia taitensis*) or ylang-ylang (*Cananga odorata*), is used in body massages and for the hair. The oil is also used in making soap.

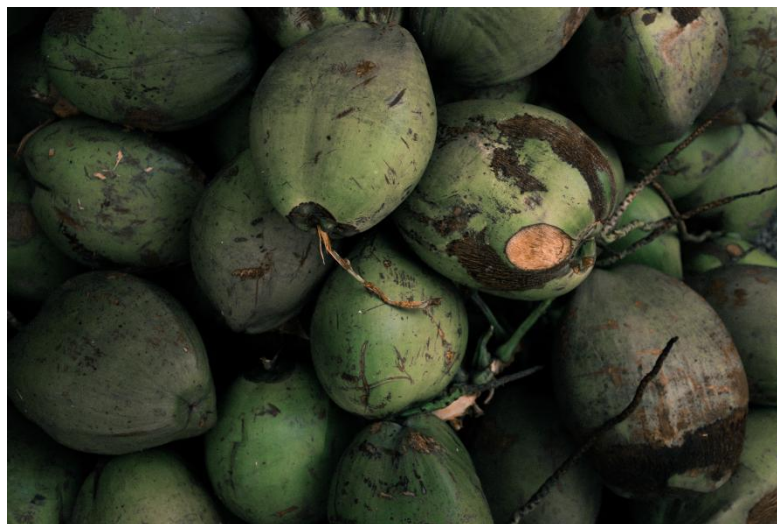
O. Oil/lubricant

Lauric oils, the dominant fatty acid (45–48%) in coconut oil, are obtained from kernels and used for cooking as well as in detergents, soaps, cosmetics, etc. The oily kernel is chewed and spat on the ocean to “calm” the water and see below the surface.

Health benefits of Coconut -

Coconut is low in carbs, so it is the best substitute for carb-rich snacks. It contains minerals and nutrients such as potassium, sodium, manganese, vitamin B, copper, and iron. Manganese is beneficial for our bone health. Copper and iron help maintain red blood cell's health. Coconut flesh has a high content of fat (medium-chain triglycerides) that provide instant energy and promotes fat loss in obese people. Both coconut flesh and oil have high levels of good (HDL) cholesterol which is beneficial for our hearts. Coconut is high in fiber and low in carbs, so it helps control blood sugar levels in our bodies. Coconut meat and

water contain numerous antioxidants that fight against factors causing cell damage. The antioxidant also reduces the risk of many diseases such as cancer.



Rayat Shikshan Sanstha's
D. P. Bhosale College, Koregaon
Department of Botany
2023 - 24

Wallpaper on the Occasion of World Coconut Day

Coconut and its By-products

01 September 2023

