Double Coconut
Home of Algae

Pratibha Gupta

Double Coconut is a very interesting rare giant palm listed in the Red Data Book. Getting its name because the coconuts have two lobes resembling two coconuts fused together, it was planted in 1894 in the historic Botanic Garden today known as the Acharya Jagadish Chandra Bose Indian Botanic Garden (AJCIBBG), Howrah.

Established by Col. Robert Kyd in 1787, it was known at that time as Company Bagan. Spread in an area of about 273 acres situated on the west bank of River Ganga (Hooghly), the garden is a repository of more than 12,000 trees, shrubs and climbers representing over 1,400 species together with a large number of wild and cultivated herbs. The garden is also well known for its native and exotic palms collection collected from South-East Asia and planted in an octagonal metallic enclosure – called the Large Palm House.

At the centre of the enclosure is a very interesting rare giant palm – Lodoicea maldivica (J.E.Gmel.) Pres. (Family Arecaceae) or double coconut. With its gigantic leaves today it is almost 116 years old. This plant is endemic only to two small islands, namely, Praslin and Curieus among the chain of 115 islands in Seychelles. The live full mature seed of the plant is the largest and heaviest (as recorded up to 30 kg) among the entire plant kingdom. In this garden it flowered for the first time in 2006 after attaining an age of 112 years. It is recorded as a female tree. The microclimatic condition created here has helped this plant survive so long.

In general, the microclimatic conditions on and around the trees provide a congenial environment for the growth of diverse plant forms. This also includes different algal forms that thrive on different parts of the tree such as trunk and leaf. The algae growing on the bark are widely called ‘Epiphylophytes’. To find out the diversity of algae on the double coconut tree, a study was initiated some time back.
A fortnight before the date of collection of samples, the climatic condition in and around Howrah/Kolkata was found to be mostly cloudy and bright sunshine was limited to a few days. During the period of study, Sunrise was at 04.50 am whereas Sunset was at 06.22 pm. The temperature ranged from 25.4°C to 30.4°C, rainfall 0.0 to 74.0 mm and relative humidity from 59% to 98%.

Samples from different levels of tree trunk like upper, middle and lower portion, petiole and flower was collected by gently scraping the green and bluish-greenish algal patches and from soil and pebble/boulder/stone lying around the precious tree. These samples were observed under highly sophisticated computerised Microscopes using Image Processing and Analysis Software.

Altogether 38 algal taxa belonging to 6 Classes viz. Cyanophyceae (15), Xanthophyceae (2), Chrysophyceae (2), Bacillariophyceae (10), Euglenophyceae (2) and Chlorophyceae (7) were recorded from the double coconut tree and its surrounding areas. The occurrence of such large number of algal species on the tree and surrounding areas is amazing which may be possibly due to the moist and suitable environmental conditions facilitated for most part of the year within the enclosure as a result of two different climbers i.e. Antigonon leptopus Hook. & Arn. and Porana paniculata Roxb. Overall in totality, maximum algal forms were recorded from the lower part of the tree trunk followed by upper and middle part.

The algal forms may be playing an important role in fixation of atmospheric nitrogen. For instance, Phormidium tenue found here is predominantly related with nitrogen fixation. It has also been reported that Phormidium tenue contains active compounds like sulphotolipids that have antiviral, especially anti-HIV activity (Gustafson et al., 1989, Falch et al., 1995).

Scytonema ocellatum, another algal form found here, is capable of forming an active compound phytoalexin, which is a fungicidal chemical (Patterson and Bolis, 1997). Another important species i.e. Chlorella vulgaris observed on almost all parts of the plant is well known to possess high protein content, vitamins and food value for aquaculture.

Occurrence of such a wide range of algal forms with antiviral, antimicrobial, antifungal and antibiotic activity has been possibly giving protection to this rare plant to fight various pathogens over the years.

Since Lodoicea maldivica (J.E.Gmel.) Pres. is not a native plant of India, its conservation in the garden for the last 116 years is indeed remarkable. The occurrence of such a large number of algal forms on it in the same environment has led to the formation of a large and distinct biome reflecting association and succession.

This is a unique finding reported for the first time from a single, rare, slow growing tree species supporting such a vast diversity of algal forms belonging to six Classes on almost all part of its body from the base of the trunk to the tip of the tree.

Dr. Pratibha Gupta is Scientist ‘D’, Botanical Survey of India, MOEF, Govt. of India, CNH Building, Botanic Garden, Howrah-711103

The microclimatic conditions on and around trees provide a congenial environment for the growth of diverse plant forms. This also includes different algal forms that thrive on different parts of the tree such as trunk and leaf.