Kew

PLANTS PEOPLE POSSIBILITIES

Titan Arum

One of the most spectacular plants to be found in the wet tropics zone of the Princess of Wales Conservatory is the Titan Arum (*Amorphophallus titanum*). With its huge flowering structure (inflorescence) rising some three metres above the ground and its single immense leaf, it certainly is a giant among plants, as its name suggests.

The Titan Arum that flowered at Kew in 1996 reached nearly 3m in height

A blooming giant

The massive inflorescence consists of a bell-shaped spathe, up to three metres in circumference, with ribbed sides and a frilled edge, around a central spike-like spadix. On the outside, the enveloping spathe is green speckled with cream, but its interior is rich crimson. At its base, the spathe forms a chamber enclosing the flowers which are carried at the lower end of the greyish-yellow spadix.

The inflorescence arises from an underground tuber, a swollen stem modified to store food for the plant. This tuber, more or less spherical in shape and weighing 50kg or more, is the largest such structure known in the plant kingdom.

A giant leaf

After flowering, the inflorescence dies back and in its place a single leaf emerges. Reaching the size of a small tree, up to 6m tall and 5m across, the leaf consists of a sturdy glossy green stalk mottled with cream which divides into three at its apex and bears numerous leaflets. Sugars made in the leaf are transported back to the tuber for storage as starch. The old leaf withers before a new one develops, using the tuber's energy stores. Eventually another inflorescence emerges, growing upwards at a rate of some 10cm per day.

How are the flowers pollinated?

At the base of the spadix, within the protective chamber formed by the spathe, is a band of cream male flowers above a ring of the larger pink female flowers. When the flowers are ready for pollination, the spadix emits a nauseating smell that attracts the pollinators. This stench, described by some as a mixture of rotting flesh and excrement, is so bad that the Indonesians call the plant 'the corpse flower'. At one time, it was rumoured that elephants pollinated the flowers, but beetles were generally thought to be responsible. Recent observations suggest that the insects which transfer pollen between the giant inflorescences are carrion flies.

Female flowers are receptive for one night only. The male flowers, above them, produce pollen the following day to avoid self-pollination. Hand pollination is difficult and must involve two inflorescences flowering in perfect sequence or the use of frozen pollen.

Attracted by the light colouration at its base, the flies enter the spathe chamber, and any pollen that they are already carrying brushes off onto the female flowers. When they leave the flower they are dusted with pollen and fly off in search of another stinking inflorescence. As the plants rarely grow in close proximity to one another, the giant inflorescence is thought to be essential for dispersing the scent over large areas to attract pollinators.

From the pollinated female flowers, the fruits develop inside the spathe chamber. Once they are ripe, the spathe withers completely exposing the bright scarlet fruits. These attract the attention of hornbills and other birds that eat them and disperse their seeds.

Kew's Titan Arum

The Titan Arums displayed in the Princess of Wales Conservatory were grown from seeds sown in 1995. It takes six years for a seed-grown plant to reach flowering size.

Titan Arums can also be propagated from leaf cuttings.

They are grown in the wet tropics zone of the Princess of Wales Conservatory. During the day, the temperature is kept at a minimum of 21°C and at night it drops no lower than 16°C. The humidity is maintained at 70% or above – mimicking the conditions prevailing in the plant's original rainforest habitat. The plants are fed regularly with a high phosphate fertiliser.

They are repotted while dormant. In winter 2004, the largest tuber, now in a 1,000L pot, weighed an astonishing 91kg (200 lb or 14 stone). This plant flowered in May 2005.

History

The Titan Arum originates in the moist shaded rainforests of Sumatra. The first European botanist to encounter it was the Italian, Odoardo Beccari, who was travelling in the region in 1878. He sent back seeds to his patron in Italy and one of the young plants that germinated from them was subsequently dispatched to Kew, where it flowered in 1889, exciting great public interest. In 1926, when it flowered again, the crowds attracted by the phenomenon were so large that the police were called to control them.

When the plant in the Princess of Wales Conservatory flowered in 1996, a scientist from Kew's Jodrell Laboratory investigated the obnoxious smells that it produced. The strongest smells occurred on two consecutive evenings, firstly when the female flowers were ready for pollination and then when the male flowers were ready to shed their pollen. Analysis of a sample of the odour identified two sulphur-containing chemicals. A similar sulphurous compound is responsible for the smell of rotten eggs.

More information

The Private Life of Plants by David Attenborough (BBC Books, 1995)

Aroids: Plants of the Arum Family by Deni Bown (Century Hutchinson, 2000)

The Genera of Araceae by Simon Mayo, Josef Bogner and Peter Boyce (Royal Botanic Gardens, Kew, 1997)

The flowering of the Titan Arum draws huge crowds to Kew

The giant leaf

ROYAL BOTANIC GARDENS KEW

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