

## RUST FUNGUS ON TEMPLE TREE IN KERALA, INDIA

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### ABSTRACT

Temple tree belongs to the genus *Plumeria* of the family Apocynaceae, planted in most of the places for its beautiful fragrant flowers and its vast economical importance. This plant suffers from a serious rust fungus, *Coleosporium plumeriae*, which causes drying and death of the foliage. This species was collected from Kerala and subsequently from North-east India. A detailed account of the same is provided here.

**Key words:** India, Kerala, *plumeria*, rust.

### INTRODUCTION

Temple Tree belongs to the genus *Plumeria* of the family Apocynaceae, extensively planted in temple premises, parks, gardens and landscaped establishments. They bear beautiful, fragrant flowers of various colours and sizes, especially during the summer. These are deciduous plants with stubby branches and large leaves. About eight species are known in India and of which *Plumeria acuminata* and *P. rubra* are commonly grown as ornamental plants because of their beautiful flowers. Each species exhibits different types of leaves having acute, acuminate or broadly rounded leaf tip. The leaves of *P. alba* are quite narrow and corrugated, while leaves of *P. pudica* have an elongated oak shape and glossy, dark green color. *P. pudica* is one of the ever blooming types with non-deciduous, evergreen leaves. Another species that retains leaves and flowers in winter is *P. obtusa* (plate-I).

They are commonly known as "Temple Tree" or "Champa" in India since they are associated with temples in both Hindu and Buddhist cultures though Hindus do not use the flowers in their temple offerings. The common name "Frangipani" comes from an Italian noble family, a sixteenth-century marquis of which invented a plumeria-scented perfume. Depending on location, many other common names exist: "Kembang Kamboja" in Indonesia, "Kalachuchi" in the Philippines, "Araliya" or "Pansal Mal" in Sri Lanka, "Champa" in Laos, and "Dead man's fingers" in Australia. The Australian name is perhaps taken from its thin, leafless, finger-like branches. Many English speakers also simply use the generic name "plumeria". These plants are propagated vegetatively.

The flowers have a sweet odour and are employed for the preparation of garlands and perfumes. They vary in their fragrance, from strong to mild and from refreshing to highly objectionable and also in their keeping quality. The essential oil from the flowers possesses antifungal activity. The

flowers contain quercetin and traces of Kaempferol. The flower buds are eaten with betel leaves as a febrifuge (Plate-I).

Many parts of the plant are considered as medicinal. The bark has a stimulant action. A decoction of it is used as a purgative, emmenagogue and febrifuge. It is also given for dropsical and venereal infections and is reported to be a powerful antihyperthermic. The latex of the plant has rubefacient and purgative properties and the seeds are said to possess haemostatic properties. In India, the fruits of *P. rubra* are used as an abortifacient.

These plants sprout profusely and give foliage beauty by their lusty green colour. When leaves attain about 3-4 inches in size, bright-yellow pustules, densely scattered on the undersides of leaves appear. This disease was noticed in the Agriculture College, Vellayani, Thiruvananthapuram, Kerala. Then, noticed on the plants grown in the campus of Tropical Botanic Garden and Research Institute, Palode (Plate-II), reported it as *Coleosporium plumeriae* Pat. Now, this rust disease is noticed wherever these plants grown in and around Thiruvananthapuram. These rusty pustules appear by rupturing epidermis release mass of powdery, yellow spores. The infected leaves turn grey, fade and droop prematurely in a week time in a succession to make the plant leafless and skeletal (Plate-II). This rust fungus has been collected and examined but we failed to observe the teliospores (Plate-III). However, we could observe *Tuberculina urediniae*, the hyperparasite or fungicolous fungi or the fungi which grows on fungi. Probably this hyperparasite would have prevented the further growth of the rust fungus. Hence, this rust perpetuates in its uredinial form. However, its telial form is known in other countries.

The rust fungus passes five stages in its life cycle: Pycnia, Aecia, Uredinia, Telia and Basidia. It can persist in all stages or in any one stage except

the first and the last. This may be autoecious (completing all stages of its life cycle on a same host) or may be heteroecious (completing its life cycle on two hosts).

The occurrence of rust disease on *Plumeria* was first noticed on *P. alba* on Guadaloupe Island, West Indies which then spread to Central America to Taiwan. The rust was noticed on South Pacific islands during 1990's and eight species of *Plumeria*, including *P. rubra* were found infected by this fungus. More recently, the rust was found in

Thailand (Kobayashi *et al.* 1994a, b, Kakishima *et al.* 1995, Tangonan and Quebral 1992, Sontirat *et al.* 1994, Chung *et al.* 2005; Traquair and Kokko, 1980). In short, it has been noticed throughout the world (Anun *et al.* 2004). This rust was collected on this host from Kerala (Hosag. *et al.* 1996; Gonzalez-Ball and Ono 1998) and from north east India (Baiswar *et al.* 2008).

#### ACKNOWLEDGEMENT

We thank Dr. A. Subramoniam, Director, TBGRI, Palode for the facilities.

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