

Comparative analysis of leaf traits in two species of *Plumeria*

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Article Info	Abstract
<p>Available online on http://www.ijlsci.in</p> <p>ISSN: 2320-964X (Online) ISSN: 2320-7817 (Print)</p> <p>Editor: Dr. Arvind Chavhan</p> <p>Cite this article as: Atheaya Ela and Kamalinee Deodhar A (2015) Comparative analysis of leaf traits in two species of <i>Plumeria</i>, <i>Int. J. of Life Sciences</i>, Special Issue, A4: 42-46.</p> <p>Acknowledgement: We wish to thanks Mr. Birajdar Tushar Dnyaneshwar, for their technical support during this study.</p> <p>Copyright: © Author, This is an open access article under the terms of the Creative Commons Attribution-Non-Commercial - No Derives License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.</p>	<p>The two species belongs to genus <i>Plumeria</i> L. are <i>P. obtusa</i> and <i>P. pudica</i> has been used as an ornamental and medicinal. It is commonly known as 'White Chafa' belonging to Family Apocynaceae (Oleander family). The present paper highlights the comparison between the leaf traits (Qualitative and Quantitative) of <i>Plumeria obtusa</i> and <i>Plumeria pudica</i>. In the present study multiple morphological leaf traits such as leaf arrangement, petiole, stipule, latex, leaf surface, leaf shape, leaf margin, leaf apex, and venation were compared. The leaf size and leaf thickness were also compared. All the qualitative traits studied shows that the leaf of <i>P. obtusa</i> is glossy green, obovate, distinctive apex with entire margin whereas <i>P.pudica</i> leaf is dark green, spoon shape, acute apex with wavy margin. On comparision of quantative characters like length of the petiole and lamina of <i>P. obtusa</i> was found bigger than the <i>P. pudica</i>. The thickness of <i>P. obtusa</i> lamina was also more than <i>P. pudica</i>. It was also reported that both <i>Plumeria</i> species leaves shows spiral arrangement on the stem, presence of white milky latex, long petiole, exstipulate, and smooth leaf surface with reticulate venation. These findings are valuable in botanical identification of plant species.</p> <p>Keywords: Apocynaceae, leaf traits, <i>Plumera</i>, lamina, botanical identification</p> <p>INTRODUCTION</p> <p>There are about 133 species of <i>Plumeria</i> L. (family Apocynaceae) reported in plumeria the plant list. It is widely cultivated in India. The two species <i>Plumeria obtusa</i> and <i>Plumeria pudica</i> are evergreen and is suitable to warm climate. <i>P. obtusa</i> and <i>P. Pudica</i> has been ornamentally and medicinally used. It is easily propogated by cutting as reported by Andrew <i>et al.</i> (2013) and Devprakash <i>et al.</i></p>

(2012). According to Tung (1999) and Scot (2009) *Plumeria* species grow as small ornamental trees in parks, residential and commercial landscapes. Medicinally leaves of *P. obtusa* shows anti mutagenic activities, antibacterial activities and used for the treatment of hyper proliferative tissue. *P. pudica* also shows anti-inflammatory and antinoceptive properties reported by Fernandes *et al.* (2015). Taxonomic classification (Chaudhary *et al.* 2014) of *Plumeria* is

Kingdom : Plantae (Plants)
Subkingdom : Tracheobionta (Vascular plants)
Superdivision : Spermatophyta (Seed plants)
Division : Magnoliophyta (Flowering plants)
Class : Magnoliopsida (Dicotyledons)
Subclass : Asteridae
Order : Gentianales
Family : Apocynaceae (Dogbane family)
Genus : *Plumeria* L. (Plumeria)

Very few research have been carried out in genus *Plumeria* Radha *et al.* (2008)

Plumeria obtusa (Family: [Apocynaceae](#), Oleander family) native to West Indies including Bahamas, southern Mexico, Guatemala, and Florida. It is widely cultivated for its ornamental and fragrant flowers around the world. It secretes a milky latex sap which is poisonous and can irritate the skin. The flowers are in bouquet-like clusters of 5 white petals, a yellow center and spreading lobes.

Plumeria pudica can be grown easily and bloom heavily for a long time. Flowers are with no fragrance. *Plumeria pudica* leaves are dark green and a unique fiddle shape or spoon shape (long and thin, and widen out as a large lobes towards the tip, like the shape of a soup spoon), very short petiole, up to 13 inches long. Flowers are salverform, white, 5 overlapping petals with yellow throat up to 3 ½ inches across, and arranged on terminal cymes.

The leaves are used as a taxonomic tool for the identification of plant species. Hence on the basis

of morphological features of leaves the plant species of *Plumeria pudica* and *Plumeria obtusa* are compared and identified. *P. obtusa* and *P. pudica* were also confirmed earlier on the basis of floral morphology.

MATERIALS AND METHODS

The fresh leaves of *Plumeria obtusa* and *Plumeria pudica* were collected from the different locations of kalamboli, Navi Mumbai during the month of September – October 2015. Following qualitative morphological leaf traits were studied Leaf arrangement, petiole, stipule, latex, leaf colour, leaf surface, leaf shape, leaf margin, leaf apex and venation.

Quantitative leaf traits such as leaf thickness, petiole length, lamina size (length and width) were also studied. The petiole length and the lamina size were taken as reported by Bayramzadeh *et al.* (2012). However, the width of lamina in *Plumeria pudica* was taken from the middle of a pair of broad lobes above the middle. One hundred leaves each of *P. obtusa* and *P. pudica* were studied. The Leaf thickness was measured by using Screw gauge. Petiole, lamina length and width were measured using thread and scale.

RESULTS

1. ***Plumeria obtusa***: The leaf arrangement on the stem is spirally arranged. Long petiole is present and the maximum length of the petiole measured as 7.5 cm. Stipules are absent, hence exstipulate. Presence of white milky latex observed during plucking of leaves. The leaf is glossy green in colour with an average thickness of 0.36 mm. The leaf surface of the *Plumeria obtusa* is smooth and the margin is entire with reticulate venation. The leaf is obovate. The apex of leaf shows distinct tip and acute base. The maximum length and width of lamina measured as 35cm and 11.50cm respectively (Table 1,2 Fig.1,2,3).

2. *Plumeria pudica*: The leaf arrangement on the stem is spirally arranged. The petiole is short and maximum length of the petiole measured as 2.5cm. Stipules are absent, hence exstipulate. Presence of white milky latex observed during plucking of leaves. The leaf is dark green in colour with an average thickness of 0.20mm. The leaf

surface of the *Plumeria pudica* is wavy with reticulate venation. The leaf is spoon shape and showing acute apex and acute base. The maximum length and width of lamina measured are 29.00cm and 11.00cm respectively (Table 1,2 Fig.1,2,3).

Table 1: Comparison of Morphological traits for *P. obtusa* and *P. pudica*

Morphological traits	<i>Plumeria obtusa</i>	<i>Plumeria pudica</i>
Leaf Arrangement	Spiral	Spiral
Petiole	Petiolate	Petiolate
Stipule	exstipulate	exstipulate
Latex	White milky	White milky
Leaf colour	Glossy green	Dark Green
Leaf surface	smooth	smooth
Leaf shape	obovate	spoon shape
Leaf Margin	entire	wavy
Leaf apex	Distinct tip	Acute
Venation	Reticulate venation	Reticulate venation

Table:2 Comparison of Petiole, lamina size and leaf thickness for *P. obtusa* and *P. pudica*

Quantitative Parameters	<i>Plumeria obtusa</i>	<i>Plumeria pudica</i>
Maximum lamina length (cm)	35.00	29.00
Maximum lamina width(cm)	11.50	11.00
Maximum Petiole length (cm)	7.5	2.5
Average Leaf thickness(mm)	0.36	0.20

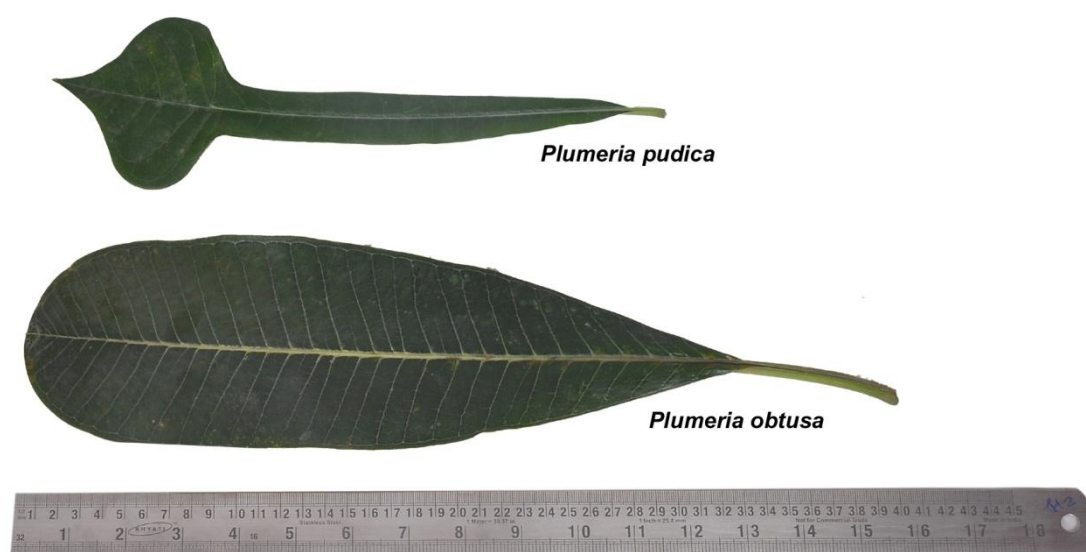


Fig 1: Leaf of *Plumeria obtusa* and *Plumeria pudica* (Dorsal view)

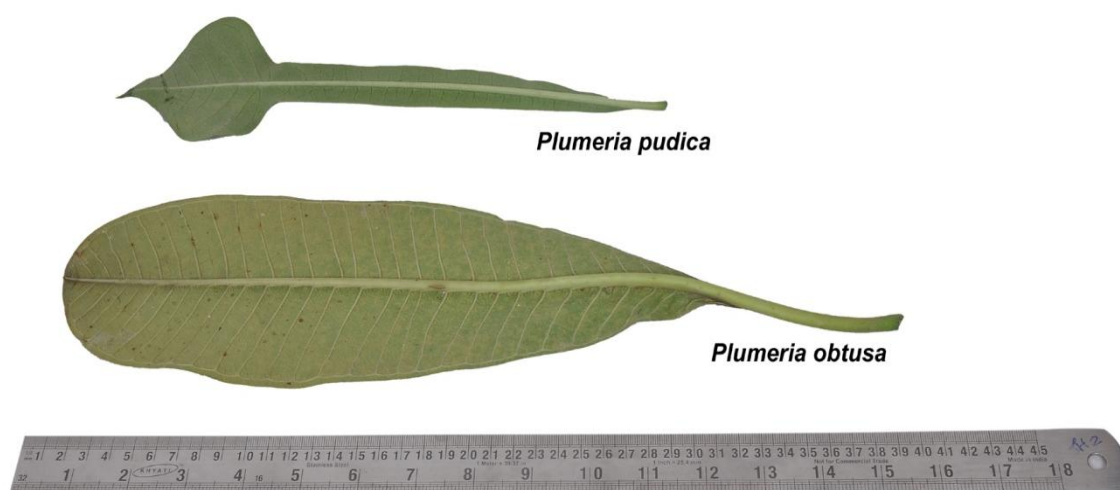


Fig 2. Leaf of *Plumeria obtusa* and *Plumeria pudica* (Ventral view)

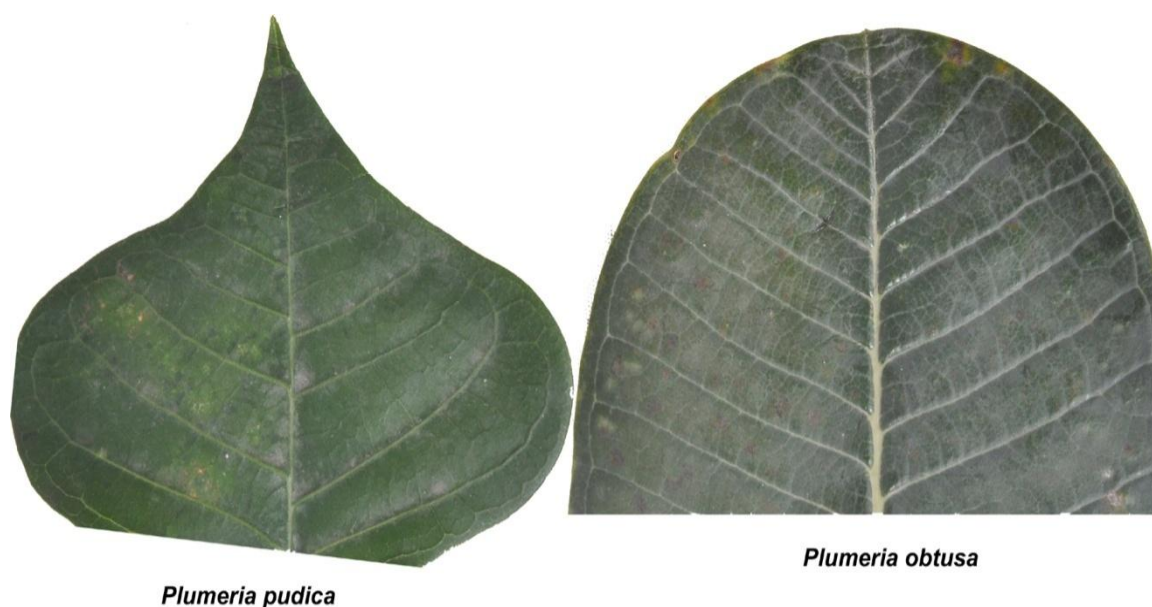


Fig 3. Leaf Apex of *Plumeria obtusa* and *plumeria pudica*.

DISCUSSION

Analysis of comparison between the leaf traits of *P. obtusa* and *P. pudica* shows that there is difference in morphological characters such as leaf colour, leaf margin, leaf shape, leaf apex and leaf thickness. In *P. obtuse*, the leaf color is glossy green, where as in *P. Pudica*, the leaf colour is

dark green. Entire margin is present in *P. obtusa* whereas *P. pudica* shows wavy margin. The shape is obovate with distinct apex in *P. obtusa* and spoon shaped having acute apex in *P. pudica*. It is observed that *P. obtusa* leaf is thicker and fleshy than leaf of *P. pudica*. Certain characteristics like spiral arrangement of leaves on stem, long petiole, exstipulate and reticulate venation are

common in both the species. Presence of white milky latex observed during the plucking of leaves in both the species. (Table 1, fig 1, 2,3).

Quantitative parameters like lamina length, lamina width, leaf thickness and petiole length were also measured and found that petiole length, lamina size and thickness of leaf of *P. obtusa* is more than the *P. pudica*. (Table 2).

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