

# Disease Note

## Diseases Caused by Fungi and Fungus-Like Organisms

### Molecular Confirmation of *Coleosporium plumeriae* Causing Rust of *Plumeria rubra* in Mexico

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Frangipani (*Plumeria rubra* L.; Apocynaceae) is a deciduous ornamental shrub native to tropical America and widely distributed in tropical and subtropical regions. In Mexico, *P. rubra* is also used in traditional medicine and religious ceremonies. In November 2018 to 2022, rust-diseased leaves of *P. rubra* were found in Yauatepec (18°49'29"N, 99°05'46"W), Morelos, Mexico. Symptoms of the disease included small chlorotic spots on the adaxial surface of the infected leaves, which as the disease progressed turned into necrotic areas surrounded by a chlorotic halo. The chlorotic spots observed on the adaxial leaf surface coincided with numerous erumpent uredinia of bright orange color on the abaxial leaf surface. As a result of the infection, foliar necrosis and leaf abscission were observed. Of the 40 sampled trees, 95% showed symptoms of the disease. On microscopic examination of the fungus, bright orange, subepidermal uredinia were observed, which subsequently faded to white. Urediniospores were bright yellow-orange. They were ellipsoid or globose, sometimes angular, echinulate, and (21.5) 26.5 (33.0) × (16.0) 19.0 (23.0) µm in size. Morphological features of the fungus corresponded with previous descriptions of *Coleosporium plumeriae* by Holcomb and Aime (2010) and Oliveira et al. (2019). A voucher specimen was deposited in the Herbarium of the Department of Plant-Insect Interactions at the Biotic Products Development Center of the National Polytechnic Institute under accession number IPN 10.0113. Species identity was confirmed by amplifying the 5.8S subunit, the ITS 2 region, and part of the 28S region with the rust-specific primers Rust2inv (Aime 2006) and LR6 (Vilgalys and Hester

1990). The sequence was deposited in GenBank (OQ518406) and showed 100% sequence homology (1,435/1,477 bp) with a reference sequence (MG907225) of *C. plumeriae* from *Plumeria* spp. (Aime et al. 2018). Pathogenicity was confirmed by spraying a urediniospore suspension of  $2 \times 10^4$  spores/ml onto 10 plants of *P. rubra*. Six plants were inoculated and sealed in plastic bags, whereas four noninoculated plants were applied with sterile distilled water. Plants were inoculated at 25°C and held for 48 h in a dew chamber; after this, the plants were transferred to greenhouse conditions ( $33 \pm 2^\circ\text{C}$ ). The experiment was performed twice. All the inoculated plants developed rust symptoms after 14 days, whereas the noninoculated plants remained symptomless. The recovered fungus was morphologically identical to that observed in the original diseased plants, thus fulfilling Koch's postulates. According to international databases (Crous et al. 2004; Farr and Rossman 2023), *C. plumeriae* has not been officially reported in Mexico despite being a prevalent disease. Diseased plants have been collected and deposited in herbaria; unfortunately, previous reports lack important information such as geographic location of sampling, pathogenicity tests, or molecular evidence, which is essential for a comprehensive study of the disease in Mexico. To our knowledge, this is the first molecular confirmation of *C. plumeriae* causing rust of *P. rubra* in Mexico. Rust of *P. rubra* caused by *C. plumeriae* has been previously identified in India, Taiwan, Malaysia, and Indonesia by Baiswar et al. (2008), Chung et al. (2006), Holcomb and Aime (2010), and Oliveira et al. (2019). This disease causes severe economic losses in nurseries, due to the defoliation of infected plants.

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#### e-Xtra

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