



First occurrence of teak leaf rust caused by *Olivea tectonae* in Côte d'Ivoire and Africa

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Teak (*Tectona grandis*) is one of the most valuable hardwoods in the world. It is native to India and Southeast Asia but it is grown as a plantation species worldwide in the tropics. In recent years several African countries have become increasingly important exporters of teak logs and sawn wood in the world market (Kollert & Walotek, 2015). In Ivory Coast about 40% of the forest plantations consist of teak, covering around 67,300 ha situated in the savannah and forest biomes. Teak has become the first forest product to be exported from Ivory Coast (Harmand *et al.*, 2015).

Leaf rust was found in September 2017 on two-eight year old teak in the region of Haut Sassandra (6°54'49.65N; 6°21'54.74W) close to the city of Daloa. The disease was then recorded from another teak plantation (Haut Sassandra, 6°54'32.47N; 6°19'18.02W) on trees that were more than 20 years old, in the vicinity of the city of Gonaïé. Some teak plants were severely infected (Fig. 1). In both plantations disease prevalence was assessed using a "zigzag-monitoring approach" investigating approximately 540 teak trees and reached around 60%.

Infected leaves initially had small, angular, brown to grey, necrotic areas on the upper leaf surfaces. As the disease progressed the lesions enlarged and coalesced to form large necrotic areas (cf. Daly *et al.*, 2006). The lesions corresponded to numerous subepidermally erumpent uredinia on the lower leaf surfaces (Fig. 1). Rarely, uredinia were detected on the upper leaf surfaces (Fig. 2).

Microscopic investigations of the fungus revealed uredinia with hyaline, incurved paraphyses measuring 31- 39 × 15- 20 µm (Fig. 3). Urediniospores were produced singly on a short pedicel, subglobose, ovoid to ellipsoid, echinulate, orange-yellow or hyaline measuring 25- 36 × 18- 21 µm. Teliospores were not observed. The observed morphological characters are in accordance with those given for *Olivea tectonae*, the causal agent of teak leaf rust, by Mulder & Gibson (1973), which is the only rust known from teak.

To fulfil Koch's postulates urediniospores from infected leaves were used to inoculate healthy teak seedlings at the eight-leaved stage under greenhouse conditions by rubbing the infected leaves on the seedlings' lower leaf surfaces. Three weeks after inoculation symptoms identical to

those on field samples developed on all fifteen inoculated plants (Fig. 4). Urediniospores were re-isolated from these plants and their identity with *O. tectonae* was microscopically confirmed.

Olivea tectonae causing teak leaf rust disease is a widely distributed pathogen in Asia and more recently has been reported from Australia, and Central and South America (Daly 2006; Cabral 2010). However, as far as could be established, teak rust disease has never been reported in Africa (Doilom *et al.*, 2016). Thus, this is the first report of teak leaf rust disease in Côte d'Ivoire and Africa. The pathogen might have been introduced with planting material for commercial teak plantations.

References

- Cabral PGC, Capucho AS, Peireira OL, Maciel-Zambolim E, Freitas RL, Zambolim L, 2010. First report of teak leaf rust disease caused by *Olivea tectonae* in Brazil. *Australasian Plant Disease Notes* 5, 113-114. <http://dx.doi.org/10.1071/DN10041>
- Daly AM, Shivas RG, Pegg GS, Mackie AE, 2006. First record of teak leaf rust (*Olivea tectonae*) in Australia. *Australasian Plant Disease Notes* 1, 25-26. <http://dx.doi.org/10.1071/DN06011>
- Doilom M, Taylor JE, Bhat DJ, Chukeatirote E, Hyde KD, To-anun C, Jones EBG, 2016. Checklist of fungi on teak. *Mycosphere* 7, 656-678. <http://dx.doi.org/10.5943/mycosphere/7/5/11>
- Harmand J-M, Zobi IC, Coulibaly B, 2015. *Etats Généraux de la Forêt, de la Faune et des Ressources en Eaux*. Rapport Technique. Abidjan, Côte d'Ivoire: Ministère des Eaux et Forêt.
- Kollert W, Walotek PJ, 2015. Global teak trade in the aftermath of Myanmar's log export ban. *Planted Forests and Trees Working Paper* 049. Rome, Italy: FAO. <http://www.fao.org/forestry/plantedforests/67508@170537/en/> (Accessed 24 October 2017).
- Mulder JL, Gibson IAS, 1973. *Olivea tectonae*. CMI Descriptions of Pathogenic Fungi and Bacteria No. 365. Kew, UK: Commonwealth Mycological Institute.



Figure 1



Figure 2

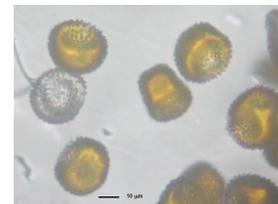


Figure 3



Figure 4

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