

## ***CALIDION BOMBACIS*, A NEW COMBINATION FOR *UREDIO BOMBACIS* WITH THE RECORD OF *BOMBACOPSIS GLABRA* (BOMBACACEAE) AS A NEW HOST FROM BRAZIL**

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### ABSTRACT

The new combination *Calidion bombacis* is proposed for the rust species formerly known as *Uredo bombacis*. This nomenclatural change is based on the examination of newly collected material of this fungus from a new host, *Bombacopsis glabra* from Brazil, and reexamination of the isotype. Until now this fungus was only known to occur in Asia (China, India and Sri Lanka). Therefore, this is also the first record of this fungus from the Neotropics.

**Keywords:** *Bombax malabaricum*, *Chrysomyxa bombacis*, *Pachira glabra*, *Puccinia bombacis*, rust fungi, Uredinales.

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*Bombacopsis glabra* (Pasq.) A. Robyns [Bombacaceae - sensu Mabberley (7) and Heywood *et al.* (5)], is a fast-growing small tree native from Brazil where it is known by the local names: castanha-do-maranhão, castanha-da-praia, cacau-do-maranhão, among others. It is indigenous to the Atlantic Tropical Rainforest of Brazil, occurring mainly along the coast from the state of Pernambuco to Rio de Janeiro. It is sometimes used as an ornamental urban tree, planted in hedges of the coastal areas of Brazil and it also produces edible nuts (6).

In August 2006, leaves of *B. glabra* showing typical rust symptoms were collected in the campus of the Universidade Federal de Viçosa (state of Minas Gerais, Brazil). The presence of a rust fungus was confirmed after examination of samples under a dissecting microscope. Free-hand sections of diseased leaf tissue bearing rust pustules were prepared and mounted in lactophenol. Slides were then examined with an Olympus BX 51 microscope fitted with a digital camera (Olympus E-330). A representative sample was dried in a plant press and deposited in the local herbarium (Herbarium VIC). Morphology of the fungus was examined and fitted well with the description of *Uredo bombacis* Petch. The newly collected material was compared with the isotype and, as discussed below, a new combination was found to be necessary under the current

morphological concept for the uredinial anamorphs of rust fungi (1). The new combination and a description based on the Brazilian specimen are presented below.

*Calidion bombacis* (Petch) D.J. Soares and R.W. Barreto comb. nov. MycoBank 511165 (Figs. 1-7).

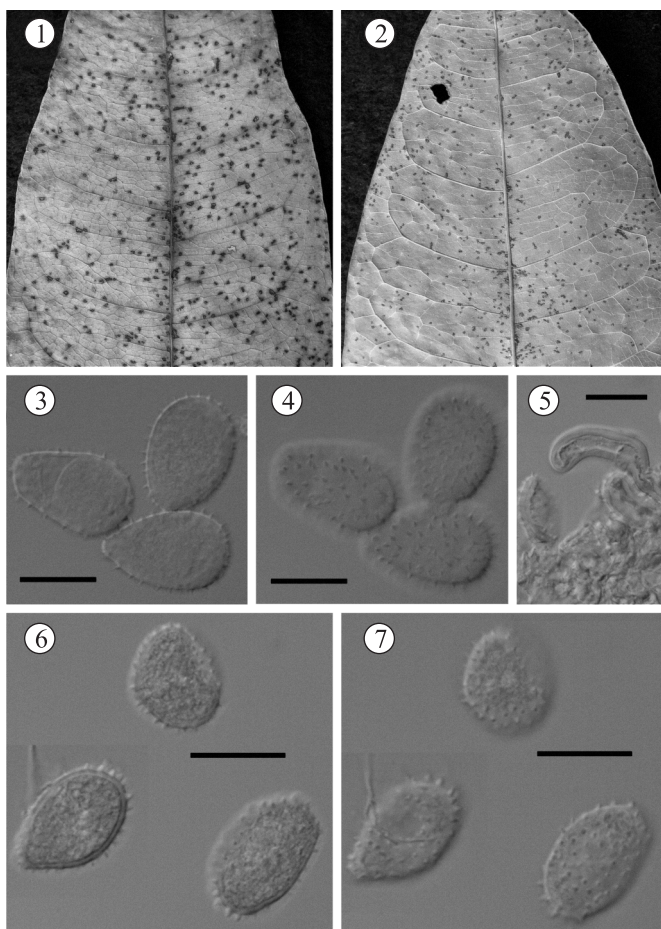
≡ *Uredo bombacis* Petch, Ann. Roy. Bot. Gard. (Peradeniya) 5:247.

*Symptoms* characterized by irregular necrotic lesions, mostly punctiform, both in young and mature leaves, usually partly vein-delimited, dark-brown to black adaxially, light brown to brown abaxially, 0.3-1.7 x 0.2-1.0 mm, rarely coalescing. *Urediniosorus* mostly hypogenous, isolate, erumpent, irregular, 34.5-97.5 µm diam., grey to yellowish. *Paraphyses* single or in fascicle, mainly concentrated at the edges of sori, falcate to strongly curved, aseptate (rarely one-septate), 6.5-7.5 µm diam., walls 1.0-1.5 µm thick, hyaline to light brown. *Urediniospores* mainly ovoid, subglobose to ellipsoid, 17.5-37 x 14.5-28 µm, subhyaline to yellowish-brown, walls 0.5-1.5 µm thick, medium to strongly equinulate (0.5-1.5 µm), germ-pores indistinct.

Material examined: on *Bombacopsis glabra* (Pasq.) A. Robyns (Bombacaceae), Silvicultura, Campus Universidade Federal de Viçosa, Viçosa, state of Minas Gerais, Brazil (VIC

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**Figures 1-7.** Halftones photomicrographs of *Calidion bombacis*. 1-2. Symptoms on *B. glabra* showing dark-brown to black punctiform lesions in the adaxial (1) and abaxial (2) leaf side; 3-4. Median (3) and superficial view of the urediniospores ex *B. glabra*; 5. A peripheral thick-walled paraphysis ex *B. glabra*; 6-7. Median (6) and superficial view of the urediniospores ex type (BR-MYC 77905). Bars = 10  $\mu$ m.

30462). On *Bombax malabaricum* DC, Peradeniya, Sri Lanka (BR-MYC 77905).

**Comments** – In Petch’s original description (8), urediniospores size of *U. bombacis* given was: 16-28 x 12-18  $\mu$ m. However in ours re-examination of the type specimen we found urediniospores with 17.5-31.5 x 14.5-20  $\mu$ m. The material of *B. glabra* from Brazil has a very similar morphology to that of the type specimen of *U. bombacis* (BR-MYC 77905, 14; 12 Dec 1911, Sydow Fungi Exotici Exsiccati n°116). One of the differences was a slight discrepancy in urediniospores size that was somewhat bigger (18-37 x 16-27  $\mu$ m) in our specimen. Another difference was the presence of distinct spots on the Brazilian specimen, while the type specimen has no evident

spots. These minor differences were not regarded as being strong enough to separate this fungus from *U. bombacis*.

At present only three rust fungi are known to occur associated with members of the Bombacaceae: *Chrysomyxa bombacis* Petch, *Puccinia bombacis* Dietel and *Uredo bombacis* Petch (3). An attempt was made to reexamine the type specimens of all rust species on the Bombacaceae but, unfortunately we were unable to trace the type of *Ch. bombacis*.

*Puccinia bombacis* was described by Dietel on *Bombax* sp. from Colombia and according to this author only the teleomorph was present (10). *Chrysomyxa bombacis* and *U. bombacis* were described by Petch from the same host (*Bombax malabaricum* DC) and same locality (Peradeniya, Sri Lanka), but in different years (8, 9). Apparently the connection between these two states was not proven or even suggested by Petch.

Uredinial stages of fungi placed in the genus *Chrysomyxa* belong to the anamorphic genus *Caeoma* (1). Reexamination of the type specimen of *U. bombacis* confirmed that it does not belong to the genus *Caeoma*. Therefore, we agree with Petch in not recognizing this taxon as a stage in the life cycle of *Ch. bombacis*.

Nevertheless, reexamination of the type specimen of *Ch. bombacis* is necessary to elucidate the somewhat puzzling situation regarding the presence of such purportedly independent rust stages at the same host and same locality. Although possible, such an occurrence of independent stages of separate rust species from the same host at the same location appears somewhat intriguing. Additionally, in the original description by Petch he mentioned that *Ch. bombacis* has eight-celled teliospores, however according to Cummins and Hiratsuka (1) *Chrysomyxa* has one-celled, catenulate teliospores. Likewise, *U. bombacis* apparently cannot be connected with *P. bombacis* because this fungus is very likely to be a microcyclic species. Our careful examination of all specimens of *P. bombacis* available at BPI and NY [BPI 050885; BPI 050886; BPI 050887; BPI 050888; BPI 852030; NY 00049146; NY 00049147 (Isotype)] confirmed that only telia are present in such materials.

After a detailed examination of the type specimen of *U. bombacis* and taking into consideration the probable lack of connection with *Ch. bombacis* and *P. bombacis*, as well as the presence of strongly curved and thick-walled paraphyses and indistinct germ-pores, even when mounted in cotton blue or lactofuchsin, we decided that *U. bombacis* would be better placed in the genus *Calidion* H. & P. Syd, following the morphological concepts adopted by Cummings and Hiratsuka (1). The genus *Calidion* was erected to accommodate an anamorphic rust fungus known only on ferns, however it is now recognized also as the anamorphic stage of *Crossopsora*, *Olivea*, *Phragmidium*, *Prospodium*, among others (1).

The present status for the rust fungi on the Bombacaceae is as follows: among the three supposedly separate species, *Ch. bombacis* is known only from Sri Lanka on *B. malabaricum* (9);

*P. bombacis* is known from Colombia occurring on *Bombax* sp. (2). Additionally another *Puccinia* sp. (possibly *P. bombacis*) was recorded on *Pochota trinitensis* (Urb.) Steyererm. & W.D. Stevens and *Pseudobombax septenatum* (Jacq.) Dugand from Venezuela (3). Unfortunately no herbarium specimen was indicated for any of those records. A *Puccinia* sp. was also found on an undetermined Bombacaceae specimen from Peru, intercepted in Honolulu, Hawaii. *Calidion bombacis* was recorded (as *U. bombacis*) from Sri Lanka, India and China, on *B. malabaricum* (8,11,12) and is reported here, for the first time, on *B. glabra* from Brazil. It represents the first record of a rust fungus in a member of the Bombacaceae in Brazil (4) and also the first record of *Ca. bombacis* outside Asia.

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#### RESUMO

***Calidion bombacis*, uma nova combinação para *Uredo bombacis* e o relato de *Bombacopsis glabra* (Bombacaceae), como um novo hospedeiro no Brasil**

A combinação nova *Calidion bombacis* é proposta para a ferrugem anteriormente conhecida como *Uredo bombacis*. Esta modificação nomenclatural é proposta baseada no exame de material deste fungo coletado em um novo hospedeiro, *Bombacopsis glabra* (Bombacaceae) no Brasil e reexame do isotipo. Até então este fungo tinha sido relatado apenas na Ásia (China, Índia e Sri Lanka). Portanto, este é o primeiro relato deste fungo nos Neotrópicos.

**Palavras-chave:** *Bombax malabaricum*, *Chrysomyxa bombacis*, ferrugens, *Pachira glabra*, *Puccinia bombacis*, Uredinales.

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