

First confirmed report of witches' broom caused by *Moniliophthora perniciosa* on cacao, *Theobroma cacao*, in Saint Lucia

P. L. Kelly^a, R. Reeder^{a*}, S. Rhodes^a and N. Edwards^b

^aGlobal Plant Clinic, CABI Bioscience UK Centre (Egham), Bakeham Lane, Egham, Surrey, TW20 9TY, UK; and ^bResearch and Development Division, Ministry of Agriculture, Forestry and Fisheries, Union, Castries, St Lucia

In November 2006, researchers at the Ministry of Agriculture, Forestry and Fisheries, first observed symptoms of witches' broom on cacao trees in the Union Vale, La Dauphine, and Robot estates in Saint Lucia. The disease has since been found in other smallholder plots throughout the island. Estate managers report up to 50% of the cacao trees are infected. Diseased trees have dense, slightly curved proliferations of shoots with shortened internodes (witches' brooms), arising from the lateral buds. Other symptoms include leaf necrosis, distortion and enlargement of the leaf lamina and veins, and stem swellings. Brooms in cacao are characteristic of infection by the fungus *Moniliophthora perniciosa* (formerly *Crinipellis perniciosa*).

In May 2007, samples of older, well-dried brooms were sent to the Global Plant Clinic, UK for confirmation of the pathogen. Aggregations of white saprotrophic hyphae were seen under the bark, which under microscopic examination revealed clamp connections that are characteristic of *M. perniciosa*. A more definitive morphological identification was obtained by inducing the fungus to produce basidiocarps. Brooms were suspended in a cabinet and subjected to a daily cycle of wetting and drying. The subsequent basidiocarps were pink, tinged with crimson and had a delicate pileus that was radially grooved with fluted edges. Fungal mycelia isolated directly from the brooms were also tested using molecular characterisation. The ITS regions of the rDNA was amplified and sequenced with fungal specific primers ITS6 (Cooke & Duncan, 1997) and ITS4 (White *et al.*, 1990). The sequence obtained (GenBank Accession No. EU861393) showed greater than 99% homology to 16 strains of this species held in the GenBank database.

Witches' broom of cacao is endemic to the Amazon basin region of South America, but has spread to plantations in the Americas and several Caribbean

islands. This fungus can cause up to 90% pod losses and is considered to be one of the main limiting factors for cacao production in South America and the Caribbean islands (Griffith *et al.*, 1994). The disease has previously been recorded from the Caribbean islands of the Dominican Republic, Grenada, St Vincent and Grenadines and Trinidad and Tobago, but this is the first confirmed report of witches' broom in cacao from Saint Lucia.

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*E-mail: r.reeder@cabi.org. Accepted 8 October 2008 at www.bspp.org.uk/ndr where figures relating to this paper can be viewed.

First report of the aecial stage of a rust disease caused by *Puccinia elymi* on *Thalictrum squarrosom* in China

Z. Li^{a,b}, Y. Li^c, X. Wang^{a,b} and D. L. Wang^{a,b*}

^aInstitute of Grassland Science, Northeast Normal University, Changchun, 130024; ^bKey Laboratory of Vegetation Ecology, Ministry of Education, Changchun, 130024; and ^cMycological Institute of Jilin Agricultural University, Changchun, 130118, P.R. China

During a plant disease survey in 2005 in Baicheng City, Jilin province of China, a rust disease caused by *Puccinia elymi* was observed on the leaves of *Leymus chinensis* (Li *et al.*, 2008). At the same site in June 2006, serious rust infection was found on the leaves of *Thalictrum squarrosom* (Ranunculaceae) around the *L. chinensis* plants infected by *P. elymi* in the previous year. The aecia were abundant, hypophyllous and aggregated on rounded or irregular thickened spots on leaves, or grouped on the thickened distorted stems, urn-shaped or more or less cylindrical, and yellow with a whitish lacinate margin. The aeciospores were angular, subglobose or ellipsoid, minutely verruculose, orange when fresh, and 17–25 × 15–20 µm. Based on the host and the morphological characteristics described, this rust pathogen was identified provisionally as the aecial stage of *Puccinia elymi* (Wilson & Henderson, 1966).

In order to confirm identification and to determine whether aeciospores of *P. elymi* from *T. squarrosom* could infect *L. chinensis* to cause rust symptoms, an inoculation experiment was performed. In June 2006, healthy leaves of *L. chinensis* grown in a greenhouse at 20°C were sprayed with an aqueous suspension of aeciospores (1 × 10⁵ spores per mL) collected from rust symptoms on *T. squarrosom*. After inoculation, the plants were covered with a transparent plastic bag for 48 h in a growth room (20°C, 16 h photoperiod) before transfer to a glasshouse. Control plants sprayed with sterile water were treated similarly. Within 8–12 days after inoculation, uredinia and urediniospores developed on inoculated leaves of *L. chinensis*. Production of teliospores was observed in September 2006. The control plants remained healthy. The urediniospores and teliospores were found to be consistent with those of *P. elymi*, confirming that the aecial stage on *T. squarrosom* was also that of *P. elymi*.

Puccinia elymi was first described on *Elymus arenarius* from Belgium in

1851. The aecia occur on *Thalictrum* spp. and the uredinia and telia have been recorded frequently on *Elymus* spp. (Cummins, 1971).

In China, a rust on *T. foetidum* collected in Tibet was provisionally identified as the aecial stage of *P. elymi*, but this has not been confirmed yet (Zhuang *et al.*, 1998). The aecial stage of *P. elymi*, however, has never been recorded on *T. squarrosom* in China or in other parts of the world. This is the first record of the aecial stage of a rust caused by *P. elymi* on *T. squarrosom*. It also confirms that aeciospores of *P. elymi* from *T. squarrosom* can cause rust symptoms on *L. chinensis* in China.

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*E-mail: liz552@nenu.edu.cn. Accepted 13 November 2008 at www.bspp.org.uk/ndr where figures relating to this paper can be viewed.