New Disease Reports

New diseases of *Trillium* in the UK caused by *Colletotrichum lineola* and *Urocystis trillii*

B. Henricot*

Department of Plant Pathology, The Royal Horticultural Society (RHS), Wisley, Woking, Surrey, GU23 6QB, UK

*E-mail: beatricehenricot@rhs.org.uk

Received: *20 Sep 2010.* ***Published:*** *03 Dec 2010.* ***Keywords:*** *anthracnose, leaf spot, smut*

Trillium species consist of temperate-forest herbs and are native to North America and Asia (Case & Case, 1997). They are spring-flowering perennials with three sepals and three petals. In the UK, they are specialist grown plants suitable for the woodland garden. In May 2005, *Trillium erectum* f. *albiflorum* diseased plants originating from a nursery in Hampshire were received at the Royal Horticultural Society. Symptoms included pale brown lesions on the stems and leaves in which dark setae were visible (Fig. 1). Conidia of the fungus were hyaline, aseptate with an acute apex and truncate base and measured 21-29 x 2.9-1.6 µm (Fig. 2). Setae were usually one-septate at the base, brown and measured 123-400 µm (Fig. 3). The morphological characteristics fitted a *Colletrotrichum* species. As there is a high variability of the morphological features in *Colletotrichum*, the identification was achieved by sequencing of the ITS and the histone3 (HIS3) regions (Damm *et al*., 2009). The ITS and HIS3 regions were amplified using ITS1/ITS 4 primers (White *et al*., 1990) and CYLH3F/CYLH3R primers (Crous *et al*., 2004) respectively and sequenced (GenBank Accession Nos. HQ239359, HQ239360). Although the ITS sequence was identical to *Colletotrichum dematium* and *C. linolea*, the H3 sequence differentiated both species and confirmed the identity as *C. lineola*. An herbarium sample was deposited at the Royal Botanic Gardens, Kew (K(M)164723).

The fungus was isolated on PDA and sporulated after two weeks at 20°C under a 16 h photoperiod. To fulfil Koch's postulates, *Trillium grandiflorum* plants were dipped in a suspension of ~ 2 x 10^6 spores/ml and covered with a plastic bag for 48 hrs to maintain a high humidity. The plants were left outside where the temperature ranged from 12° to 25°C. After two months the plants collapsed and the fungus was re-isolated from the inoculated tissues. Control plants were water-inoculated and remained healthy.

In June 2010, *Trillium kurabayashii* plants originating from Norfolk were received at the RHS showing typical symptoms of a smut disease (Figs. 4A & B). Sori exposing black spore masses were observed mainly on stems sometimes spreading to the base of leaves. The sori were large and confluent with individual sori reaching 3.5 cm in length. Ellipsoid, ovoid brown spore balls measured 29-42 x 29-58 µm and were surrounded by a layer of hyaline sterile cells measuring 8-12 x 5-9 µm. The spores were chestnut-brown ovoid or polyhedral and measured 14-23 x 11-17 µm (Fig. 5). The morphological characteristics fit the description of the smut fungus *Urocystis trillii* (Jackson, 1920). An herbarium sample was deposited at the Royal Botanic Gardens, Kew (K(M)166157). The ITS region was sequenced as above (GenBank Accession No HQ239361) and was unique when compared to other sequences in GenBank.

Colletotrichum lineola is a widespread pathogen affecting a wide range of plant species in temperate regions. The only occurrence of the fungus on *Trillium* was reported from the USA (Farr & Rossman, 2010). *Urocystis trillii* is a rarely reported smut specific to *Trillium* that occurs in Canada, Japan and Western North America (Farr *et al.*, 2010). This is the first case of the disease in the UK or indeed Europe.

References

Case FW, Case RB, eds, 1997. *Trilliums*. Timber Press, USA.

Crous PW, Groenewald JZ, Risède J-M, Simoneau P, Hywel-Jones NL, 2004. *Calonectria* species and their *Cylindrocladium* anamorphs: species with sphaeropedunculate vesicles. *Studies in Mycology* **50**, 415-430.

Damm U, Woudenberg JHC, Cannon PF, Crous PW, 2009. *Colletotrichum* species with curved conidia from herbaceous hosts. *Fungal Diversity* **39**, 45-87.

Farr DF, Rossman, AY, 2010. Fungal Databases, Systematic Mycology and Microbiology Laboratory, ARS, USDA. Retrieved June 29, 2010, from http://nt.ars-grin.gov/fungaldatabases/

Jackson HS, 1920. New or noteworthy North American Ustilaginales. *Mycologia* **12**, 149-156. [doi:10.2307/3753257]

White TJ, Burns T, Lee S, Taylor J, 1990. Amplification and direct sequencing of fungal ribosomal genes for phylogenetics. In: Innis MA, Gelfand DH, Shinsky J, White TJ, eds. *PCR protocols. A guide to methods and applications*. San Diego, CA, USA: Academic Press, 315-322.

Figure 1

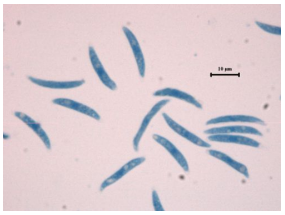

Figure 2

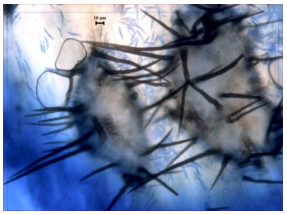

Figure 3

Figure 4

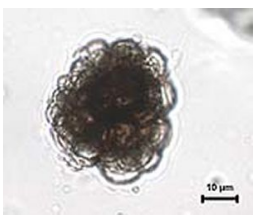

Figure 5

To cite this report: Henricot B, 2010. New diseases of *Trillium* in the UK caused by *Colletotrichum lineola* and *Urocystis trillii*. *New Disease Reports* **22**, 32. [doi:10.5197/j.2044-0588.2010.022.032]

This report was published on-line at www.ndrs.org.uk where high quality figures can be found