



## First record of *Septoria rudbeckiae* on *Rudbeckia* in the United Kingdom

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Species of *Rudbeckia*, often known as black-eyed Susan or coneflower, are used as bedding plants in UK gardens. The large, daisy-like flowerheads typically have bright yellow petals and a conspicuous black centre which may be raised into a cone shape. During the summer of 2016, *Rudbeckia fulgida* var. *sullivantii* cv. Goldsturm plants, purchased in the preceding May from a nursery in south-east England, were observed with black leaf spots in outdoor beds at the Royal Horticultural Society (RHS) Garden Wisley. Lower leaves exhibited small black lesions in July, which coalesced as the season progressed leading to complete necrosis of the bottom leaves and spotting on higher leaves. Spots showed no halos and became necrotic only later in the season. Flowering did not appear to be reduced.

Pycnidia within the leaf spots were epiphyllous, 50–75 µm diameter, with a neck protruding slightly above the leaf surface. Conidia were filiform, 30–60 × 1.5–2 µm, with three septa. A single-spore isolate was obtained on water agar and cultured on potato dextrose agar. Living cultures were deposited in the RHS culture collection held at RHS Garden Wisley (Accession No. RHS454672) and at Westerdijk Fungal Biodiversity Institute, Netherlands (Accession No. CBS145765). The internal transcribed spacer (ITS) region of rDNA, the β-tubulin (Btub) gene and the translation elongation factor 1-alpha (EF1) gene were amplified using the primers ITS4:ITS5, T1:B-Sandy-R, and EF1-728F:EF2, respectively, according to the method by Verkley *et al.* (2013). The DNA amplicons were sequenced (GenBank Accession Nos. MN093336 (ITS), MN105980 (Btub) and MN166626 (EF1)). The ITS sequence differed by one base pair from the only ITS sequence available for *Septoria rudbeckiae* (JQ677043). No previous sequences were available for comparison for Btub and EF1 and none of the available sequences had more than 90% identity.

Pathogenicity was confirmed by spraying *Rudbeckia fulgida sullivantii* 'Goldsturm' plants with a conidial suspension ( $1 \times 10^6$  conidia/ml) prepared from spores from 21-day-old cultures on potato dextrose agar, incubated at 20°C with a 12 hr light/ 12 hr dark cycle. Plants were kept in high humidity for 72 hr after inoculation. After four weeks, black lesions were observed on leaves. Pycnidia and conidia consistent with *S. rudbeckiae* were found

within each lesion. Control plants sprayed with sterilised water showed no symptoms.

*Septoria rudbeckiae* was described from the USA (Ellis & Halsted, 1890) where it is now widespread causing disfigurement of *Rudbeckia* in gardens. Although the fungus has been recorded from a number of different *Rudbeckia* species, *Rudbeckia fulgida* var. *sullivantii* cv. Goldsturm has been recognised in the USA as one of the most susceptible cultivars. *Septoria rudbeckiae* has also been reported from Canada, Bulgaria and Romania (Farr & Rossman, 2019), Turkey (as *Septoria* sp.; Gumrukcu, 2005) and Korea (Park, 2012). To our knowledge, this is the first report of *S. rudbeckiae* in the United Kingdom.

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Figure 1

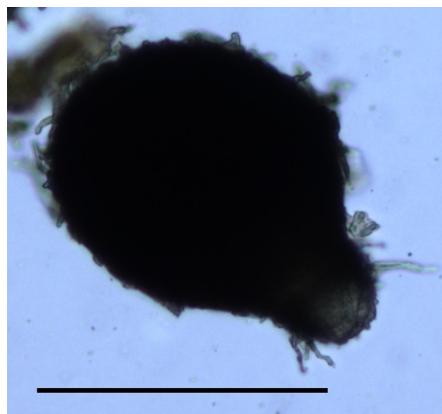


Figure 2

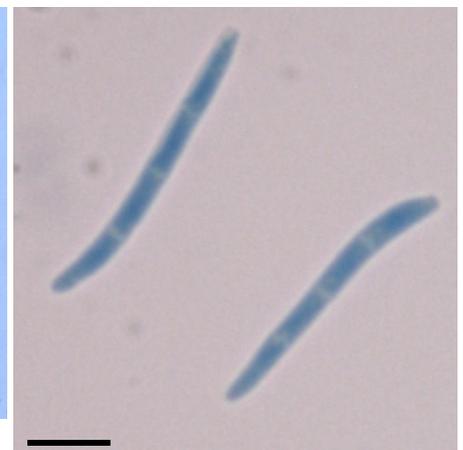


Figure 3

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