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Leptosphaeria biglobosa inhibits the production of sirodesmin PL by *L. maculans*

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Background:

Phoma stem canker is caused by two coexisting pathogens, *Leptosphaeria maculans* and *L. biglobosa*. They coexist because of their temporal and spatial separations, which are associated with the differences in timing of their ascospore release. *L. maculans* produces sirodesmin PL, while *L. biglobosa* does not. However, their interaction/coexistence in terms of secondary metabolite production is not understood.

Objective:

To investigate the interactions between *L. maculans* and *L. biglobosa* in relation to secondary metabolite production, especially sirodesmin PL production by *L. maculans* and its effects on disease development, for improving phoma stem canker control strategies

Methods:

Secondary metabolites were extracted from liquid cultures, *L. maculans* only (Lm only), *L. biglobosa* only (Lb only), *L. maculans* and *L. biglobosa* simultaneously (Lm&Lb) or sequentially 7 days later (Lm+Lb). The composition of secondary metabolites was analysed using HPLC and LC-MS. The effects of these extracts on growth of *L. maculans* and *L. biglobosa* was tested by inoculating fungal plugs with 20µL of the extract and calculating colony area was calculated after 7 days. The effects of *L. biglobosa* on disease development and sirodesmin PL production by *L. maculans* in planta was done by inoculating cotyledons with SDW, Lm only, Lb only or Lm&Lb and calculating lesion area 17 days post inoculation and assessing sirodesmin PL production 26 days post inoculation.

Results:

Metabolites from 'Lb only', 'Lm&Lb' or 'Lm+Lb 'caused significant reductions in *L. maculans* colony area. However, only the metabolites containing sirodesmin PL caused a significant reduction to *L. biglobosa* colony area. When oilseed rape cotyledons were inoculated with conidia of 'Lm only', 'Lb only 'or 'Lm&Lb', 'Lm only' produced large grey lesions, while 'Lm&Lb' produced small dark lesions similar to lesions caused by 'Lb only'. Sirodesmin PL was found only in the plant extracts from 'Lm only'.

Conclusions:

For the first time, *L. biglobosa* has been shown to inhibit the production of sirodesmin PL by *L. maculans* when interacting simultaneously with *L. maculans* either *in vitro* or *in planta*. This antagonistic effect of interspecific interaction may affect their coexistence and subsequent disease progression and management.