

# Symptom development on oilseed rape after combined inoculation with *Phoma lingam* isolates belonging to different pathogenicity groups

Birger Koopmann, Christina Onken, Evelin Vorbeck and Hans-Heinrich Hoppe

Institute of Plant Pathology and Plant Protection, Georg-August-University Göttingen, Grisebachstr. 6,  
D-37077 Göttingen, Germany

Blackleg disease or stem canker of oilseed rape is caused by the ascomycetous fungus *Phoma lingam*. Different strains can be isolated from oilseed rape differing in aggressiveness. After inoculation with non-aggressive isolates, oilseed rape displays only restricted symptoms on cotyledons, true leafs and stems. In contrast severe symptoms are observed after inoculation with aggressive isolates. Due to this and many other traits that are specific to these strain types, they now have been separated into different species. While the perfect stage of aggressive isolates is still named *Leptosphaeria maculans*, non-aggressive strains (to be exactly NA1) are now termed *Leptosphaeria biglobosum*. Aggressive isolates can be further subdivided into races due to cotyledon resistance reactions of specific cultivars of a *Brassica napus* differential set. Due to this specific situation it is of interest how disease severity will be influenced if not only one strain affects a host plant. In this view we studied the effect of combined inoculations on disease expression on a differential cultivar on cotyledons and stems. We used combinations of NA1/A1 (or PG1/PG4 following the nomenclature of Williams), NA1/A2 (PG1/PG3) and A2/A1 (PG3/PG4) which were tested on the A2 (PG3) and NA1 (PG1) resistant cultivar Quinta. Disease severity was compared to inoculations with single isolates. Results show that symptoms caused by isolate mixtures on the stem are intermediate compared to single isolate inoculations. The effect was most significant when using NA1 in mixtures. The effects on cotyledons were more pronounced than those observed on the stem. The non-aggressive isolate induced resistance that was also effective against aggressive isolates modulating cell collapse to an HR like necrosis and inhibiting sporulation. It should be noticed that results of resistance tests relying on isolate mixtures may be uncertain if the components of the mixture will not be carefully tested for aggressiveness. It is strongly recommended not to use *Leptosphaeria biglobosum* (NA1) strains in isolate mixtures to assess Phoma resistance.