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Analysis of the determinants of adaptation of *Leptosphaeria maculans* 'brassicae' to a new host species

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Plant-pathogenic fungi present extreme adaptive abilities, allowing them to circumvent any new control methods. The Dothideomycete fungus *Leptosphaeria maculans* 'brassicae' (Lmb) causes stem canker of cruciferous species and exhibits a hemibiotrophic lifecycle on oilseed rape (*Brassica napus*). So far, the most effective control method against Lmb consists in breeding naturally resistant cultivar of *B. napus*. The disease resistance follows gene-for-gene relationship: a product of a host resistance gene (R gene) interacts directly or indirectly with the product of a matching avirulence gene (Avr) of the pathogen stimulating host immunity and resistance response. These monogenic, cultivar-dependant, resistant sources are rapidly overcome. In particular, in Lmb, this adaptive ability relies notably on the location of *AvrLm* genes in repeat-rich genomic regions of Lmb. Contrary to host resistance, nonhost resistance confers complete resistance of all genotypes of a plant species to all genotypes of a pathogen species. Plant pathogenic fungi can also adapt to a new host following a host range expansion or a host jump; in the latter case, the pathogen losses ability to infect the ancestral host. Recently, an isolate of Lmb was identified as partially adapted to *Brassica carinata*, a plant species considered as nonhost for Lmb so far; this isolate cannot infect *B. napus*. A cross was performed between this isolate and an isolate infecting *B. napus*. Symptoms caused by the progeny show a continuous phenotypic variation on both hosts. This suggests a complex determinism, involving many genes, of the adaptation of Lmb on these hosts. The integrative analysis of comparative genomic, transcriptomic, genetic and phenotypic data will help shed light on mechanisms underlying adaptation to different hosts in *Leptosphaeria maculans* 'brassicae' and on resistance mechanisms in two Brassica species.

keywords: *Leptosphaeria maculans*, adaptation, *Brassica napus*, *Brassica carinata*, resistance.