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#127: The combination of resistance alleles at a major and minor effect QTLs confers a broad spectrum resistance to *Globodera pallida*

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Globodera pallida is the most damaging cyst nematode attacking potatoes (*Solanum tuberosum*) cultivated in temperate climates. Several potato related species showed a high level of resistance with oligogenic determinism. *S. sparsipilum*, *S. spgazzinii* and *S. vernei* species all displayed a major effect resistance QTL on chromosome V (GpaV locus). Other minor effect resistance QTLs were detected on chromosomes VI, VIII, IX XI and XII, depending on the resistance source. To build potato cultivars with durable resistance to *G. pallida*, we aimed to evaluate the resistance level and the spectrum of action conferred by different allelic combinations at QTLs.

Resistance of potato diploid clones, carrying different combinations of alleles at resistance QTLs originating from *S. sparsipilum* or *S. spgazzinii*, was assessed with eight populations of *G. pallida*, originating from four European countries and New-Zealand. Resistance of tetraploid clones, carrying at least one GpaV QTL originating from *S. vernei*, was assessed with the same *G. pallida* populations.

Aggressiveness level of *G. pallida* populations differed depending on the resistance sources. The resistance conferred by the resistance allele at the sole major effect GpaVspl QTL ranged from a high to a medium level, depending on nematode population. Conversely, a single minor effect QTL or combinations of minor effect QTLs conferred a low resistance level towards the eight populations. Only the association of one major effect QTL and at least one minor effect QTL conferred a high resistance level towards the eight populations.

These results illustrate that broad-spectrum of resistance to *G. pallida* could be obtained by introgressing both one major QTL and one or several minor QTLs in potato cultivars. Moreover, they highlight that combinations of QTLs originating from several potato related species could ensure high resistance level to a large range of *G. pallida* populations.