

Leaf position, leaf age and plant age affect the expression of downy mildew resistance in *Brassica oleracea*

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Received: 12 December 2006 / Accepted: 26 March 2009 / Published online: 5 May 2009
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Abstract Downy mildew caused by the oomycete *Hyaloperonospora parasitica* (formerly *Peronospora parasitica*) is a worldwide foliar disease of Brassica vegetables, which may cause seedling loss in the nurseries and damage to adult plants in the field. Disease symptoms start from the lower leaves and progress upwards. Three experiments were conducted under controlled environment conditions, using inoculated leaf discs, to determine the influence of leaf position, plant age, and leaf age on the expression of resistance to downy mildew in various *Brassica oleracea* genotypes. The upper leaves were more resistant than the lower leaves when 7–19 week-old plants of broccoli and Tronchuda cabbage were tested. Broccoli lines ‘PCB21.32’ and ‘OL87123-2’ were fully susceptible at the cotyledon stage, showed a clear resistance increase from lower to upper leaves at 6 weeks and ‘PCB21.32’ was fully resistant 16 weeks after sowing. Immature leaves were more resistant than adjacent fully expanded mature leaves. Susceptibility increased with leaf age when the same

leaf was tested at two to 4-week intervals. Leaf age and upper-leaf position on the stem had opposite effects on disease score, since younger leaves collected from lower positions and older leaves collected from upper positions tended to score similarly in compatible interactions. The progression of downy mildew from the base of the plant upwards on *B. oleracea* in the field could be due to differences in leaf resistance in addition to environmental variation. To maximise the expression of a compatible reaction in adult plants lower leaves of Brassica plants that are at least 12 weeks-old should be used.

Keywords Disease resistance · Broccoli · Tronchuda cabbage · *Hyaloperonospora parasitica*

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