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Surprising effect of nitrogen nutrition regimes on the development of *Botrytis cinerea* and *Sclerotinia sclerotiorum* on lettuce plants

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Although nitrogen (N) fertilisation is known to affect disease development in a variety of host-parasite systems, information is lacking on lettuce drop and grey mould, caused respectively by *Sclerotinia sclerotiorum* and *Botrytis cinerea*. Studies were carried out to investigate the effect of five regimes of nitrogen nutrition on the susceptibility of lettuce plants to six strains of *B. cinerea* known to differ in their aggressiveness on tomato and one strain of *Sclerotinia sclerotiorum*. For this, one-month old plants were subjected to differential fertigation regimes with nitrogen inputs varying from 0.5 to 20 mMol. L⁻¹ NO₃⁻. Plants were grown under those regimes for 3-4 weeks prior to inoculation. Three independent tests were conducted over a three-year period. The fertigation regimes resulted in contrasted development of the lettuce plants and they affected significantly the mineral composition and sugar (fructose, glucose and sucrose) content of the plant tissue, analyzed just before inoculation. Total fresh and dry weights, N, NO₃⁻, P and K contents increased with increasing N concentrations. Leaf area also increased with increasing N concentration up to a threshold level (10 mMol. L⁻¹) above which there was no further increase. In contrast, Ca, Mg and C contents were decreased at higher N levels and the C content did not vary significantly. Contrarily to results obtained in previous studies with tomato, (1) no marked difference in aggressiveness was observed among the six strains, and (2) high N nutrition increased (rather than decreased) the susceptibility of lettuce plants against *B. cinerea*. For all six strains tested, the overall disease severity (assessed by the surface of necrotic lesions), increased with increasing N. The high N fertilization also increased the susceptibility of lettuce to *S. sclerotiorum*. Among all possible factors tested, total N, K and sucrose contents were positively correlated to the surface of the leaf lesions caused by *B. cinerea*, K and sucrose were positively correlated with those caused by *S. sclerotiorum*. Results of this study indicate that increasing NO₃⁻ in the nutrient solution positively affected vegetative growth of lettuce plants but it also increased the susceptibility of plants to *B. cinerea* and *S. sclerotiorum* infection in lettuce.

Keywords: Grey mould, susceptibility, host resistance, N fertilization, *Lactuca sativa*

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