

A Dual Pathogen Strategy for the Biological Control of Groundsel, *Senecio vulgaris*

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Infection with rust, *Puccinia lagenophorae*, causes loss of competitive vigour in common groundsel, *Senecio vulgaris*, but rarely results in the death of the host. A high level of mortality was, however, observed in groundsel infected by rust in the field during autumn. The mortality was attributed, at least in part, to secondary infections caused by opportunistically pathogenic fungi. Of these fungi, *Botrytis cinerea*, which was commonly isolated from damaged plants in the field, was selected for further investigation in the laboratory. Neither rust infection nor *B. cinerea* killed groundsel alone, but when rust and *B. cinerea* were applied successively, groundsel was killed by inoculum doses of *B. cinerea* as low as 104 conidia ml⁻¹ and very low levels of rust infection. When single rust pustules were induced on the stem base, plant mortality following a subsequent inoculation of *B. cinerea* occurred within 14 days. Nutrient leakage onto the leaf surface was increased in the area of the pustule and caused enhanced germination of conidia of *B. cinerea*. This enhanced germination, which was greatest at the margins of rust pustules, was correlated with enhanced infectivity. A number of other secondary invaders were isolated from rusted groundsel in the field and reinoculated onto rusted groundsel in the controlled environment in order to determine their potential efficacy as part of a dual pathogen biological control strategy. Of these fungi, some (e.g., *Phoma exigua*, *Alternaria alternata*, *A. zinniae* and *Fusarium culmorum*) killed rusted groundsel as rapidly as or more rapidly than, *B. cinerea*. *A. alternata* was chosen for host-specificity testing and, following rust infection, gave complete control of groundsel grown in mixture with a number of vegetable crops. No visible damage was observed in the crop species.
