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mycorrhizas: A link with other types
of mycorrhizal association



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Influence of Cellulase on the Susceptibility of Non-Host Cabbage to Colonization by *Glomus intraradices*

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Summary.- A preparation of cellulase and pectinase from *Aspergillus niger* was applied to the arbuscular mycorrhizal non-host cabbage plants. The following enzyme solutions were tested: 3 and 33 units of cellulase, 0.22 units of pectinase, and 3 units of cellulase plus 0.22 units of pectinase. The application of 3 and 33 units/ml of cellulase increased the growth of cabbage plants inoculated with *Glomus intraradices*. Some increase in fungal structures inside the roots was observed when 33 units/ml of cellulase was applied. However, no relationship was found between the presence of fungal structures in cabbage and its effect on plant growth.

Keywords: cellulases, *Chenopodiaceae*, *Glomus intraradices*, arbuscular mycorrhiza, non-host plants

Introduction

Several plant families such as Cruciferae and Chenopodiaceae are nonmycotrophic to arbuscular mycorrhizal fungi (AMF) (3). It has been proposed that intrinsic or internal factors control mycorrhizal colonization (6, 10). In fact, the signals for appressoria production cannot be detected in host exudates, suggesting that these molecules are tightly bound to roots, or else occur inside the host root (9). These molecules may be involved in the absence of colonization of non-host plants.

There is evidence that the penetration of root by AMF involves cell wall hydrolyzing enzymes (2). These enzymes may lead to an organized colonization of the root (1). The application of a mixture of cellulase and pectinase was able to remove a barrier to *Rhizobium*-host specificity (5). However, no attempt has been made to promote the colonization of nonmycotrophic plants with hydrolytic enzymes. We investigated whether such enzymatic treatment of cabbage roots could remove a barrier that can normally be overcome only in a host-specific manner.

Materials and Methods

Experiment 1. This experiment was carried out in 20 x 200 mm glass tubes filled with 25 g of a sand:vermiculite mixture (1/1, v/v) and 12 ml of diluted (1/2) Hewitt's nutrient solution (4) plus 50 mg ml⁻¹ K₂HPO₄ (pH 7). The tubes were plugged with cotton wool and autoclaved at 120° C for 20 min, and then inoculated with 1 g of rizosphere soil from maize plant pot cultures of *Glomus intraradices* which contained spores, mycelium and colonized root fragments. In control tubes a filtered colonized root washing was added to the sterilized sand:vermiculite mixture. Seeds of cabbage (*Brassica oleraceae*) were surface-sterilized with HgCl₂ for 10 min and thoroughly rinsed with sterilized water. After germination, seedlings were selected for uniformity before planting. Plants were grown in a chamber with supplementary light provided by Sylvania incandescent and cool-white lamps, 400 nmol m⁻² s⁻¹ (400-700 nm), with a 16/8 h day/night cycle at 25/19° C and 50% relative humidity.

Experiment 2. This experiment was done in open pots (300 g) with a sand:vermiculite (1/1; v/v) mixture. Cabbage was used as the test plant. Seeds were grown in moistened sand and 2-week-old seedlings were transplanted to the pots and grown under greenhouse conditions. Pots were inoculated with 5 g of rizosphere soil from the same maize plant pot cultures of *G. intraradices* as in Experiment 1. In control pots a filtered colonized root washing was added to the sterilized sand:vermiculite mixture. Plants were watered from below, with a capillary system, and diluted (1/4) Hewitt's nutrient solution (4) plus 25 mg ml⁻¹ K₂HPO₄ or distilled water were added every fortnight.

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