

Bouma, T.J., Nielsen, K.L., Eissenstat, D.M. and Lynch, J.P. 1997. Soil CO₂ concentration does not affect growth or root respiration in citrus or bean. *Plant, Cell & Environment*. 20: 1495-1505.

Abstract

Contrasting effects of soil CO₂ concentration have been reported on root respiration rates during short-term exposure and on plant growth during long-term exposure. Here we examine the effects of both short- and long-term exposure of soil CO₂ on root respiration of intact plants and plant growth for bean (*Phaseolus vulgaris* L.) and citrus (*Citrus volkameriana* Tan. & Pasq.). For rapidly growing bean, the growth and maintenance component of root respiration were separated to determine if they differ in sensitivity to soil CO₂. Respiration rates of citrus roots were unaffected by the CO₂ concentration used during the respiration measurements (200 and 2000 μmol mol⁻¹), regardless of the soil CO₂ concentration during the previous month (600 and 20 000 μmol mol⁻¹). Bean plants were grown with their roots exposed to either a natural CO₂-diffusion gradient, or to an artificially maintained CO₂ concentration of 600 or 20 000 μmol mol⁻¹. These treatments had no effect on shoot and root growth. Growth and maintenance respiration of bean roots were also unaffected by CO₂ pre-treatment and the CO₂ concentration used during the respiration measurements (200 to 2000 μmol mol⁻¹). We conclude that soil CO₂ concentrations in the range likely to be encountered in natural soils does not affect root respiration in citrus and bean.