

Approaches to assess climate change effects on plant disease: (1) impacts of rising CO₂ in Brazil.

Raquel Ghini - Embrapa Environment, Caixa Postal 69, CEP 13820-000
Jaguariúna, SP, Brazil.

raquel@cnpma.embrapa.br

Atmospheric carbon dioxide concentration is projected to increase rapidly in the future and it is expected to affect agroecosystems. Open-top chambers (OTC) are installed at Embrapa Environment (Jaguariúna, São Paulo state, latitude 22° 41' S, longitude 47° W), since 2005, to evaluate the effects of increasing CO₂ concentration on plant diseases. The OTCs are roofless cylinders measuring 1.9 m in diameter by 2 m in height, and constructed with aluminum frame covered with transparent plastic. The trials included three treatments: OTC with elevated CO₂ concentration (approximately, 550 ppm), OTC with ambient atmosphere, and control without OTC. The treatments are randomized in blocks with three replications. Air sampling, gas measurement and gas injection are automatically performed at 10-min. intervals, 24-hours a day. The effect of elevated atmospheric CO₂ concentration on rice blast incidence, caused by *Pyricularia grisea*, was studied with two rice cultivars (IAC 202 and Agulha Precoce). For both cultivars, the occurrence and severity of the disease were higher for plants grown under elevated CO₂ concentration as indicated by the increased number of diseased plants, leaves with lesions per plant, symptom severity and number of sporulating lesions per plant. Surveys with soybean revealed that elevated CO₂ altered significantly severity of powdery mildew and Asian soybean rust, caused by *Erysiphe diffusa* and *Phakopsora pachyrhizi*, respectively. There is no FACE (Free Air Carbon Dioxide Enrichment) facility in Brazil. A national project is being elaborated by Embrapa and institutions partners aiming to assess the impacts of climate change on plant diseases, pests and weeds (Climapest project). The project will have the objective to simulate future scenarios of pest epidemics under climate change, by elaborating geographic distribution maps of pest risk in Brazil; assess the effects of temperature, UV-B and rising CO₂, including the establishment and operation of FACE facility.