From alpine grasslands to tropical forests:
Biological consequences of elevated atmospheric CO_2
(a synthesis of Swiss research)
Scientific symposium, Basel, March 14-16, 1996

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announcement

From alpine grasslands to tropical forests: Biological consequences of elevated atmospheric CO_2 (a synthesis of Swiss research) Scientific symposium, Basel, March 14-16, 1996

ProClim–

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Atmospheric CO_2 enrichment is one of the few doubtless components of global change. Besides its influence on the climate system CO_2 affects the biosphere directly, because it is a key resource for photosynthesis. Consequently, "CO_2 fertilization" has been found many times to stimulate plant growth and agricultural yield, provided other resources were not limiting. However, many uncertainties still exist with respect to CO_2 responses of plants and ecosystems when life conditions are suboptimal, when mineral nutrients, water or light are limiting, when plants compete for these resources and when interactions with other organisms come into play. Swiss biological CO_2 research has accumulated a substantial body of evidence to answer these questions.

This symposium will provide a first national synthesis. The meeting will be held under the auspices of the Swiss National Committee of IGBP, the Forum for Climate and Global Change (ProClim/SANW) and the NFP 31 and SPPU programs of the Swiss National Science Foundation, and will be organized locally by the Institute of Botany in Basel. Short oral presentations will provide the essence of year-long research ranging from single plant studies under controlled conditions to investigations of whole ecosystems, from agricultural to natural vegetation and from high mountains to lowland tropical forests.

Program overview

Thursday
Individual plant studies
Herbaceous model communities
Fertile Swiss grassland
Mediterranean grassland

Friday
Calcareous grassland
Alpine grassland
Spruce model ecosystems

Saturday
Spruce-beech model ecosystems
Mediterranean forests
Tropical model ecosystems
Tropical rain forest

Travel information:

The meeting will be held in the lecture hall of the Institute of Botany which is in the immediate neighbourhood of the medeval Spalentor. Please note that there is no parking.
Arriving by train at Basel main station: Take tram no. 2 to Bankverein, change to tram no. 3 until Spalentor.

Conference address:

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Thursday, March 14

Scope and theoretical framework

09.00 - 09.10 **Ch. Körner**
Welcome and introduction

09.10 - 09.30 **J. Fuhrer, M. Riedo**
Modelling grassland responses to climate change and elevated CO_2

Individual plant studies

09.30 - 09.45 **J. Nösberger**
White clover: the relevance of source and sink under different CO_2 regimes

09.45 - 09.55 **Ch. Körner, R. Christ**
Wheat: the significance of the first few days

09.55 - 10.20 **Break**

10.20 - 10.30 **Ch. Körner, Pelaez-Riedl, A. van Bel**
Screening for CO_2 responsiveness: the transport problem

10.30 - 10.45 **J. Bucher**
Spruce seedlings: CO_2 memory effects?

10.45 - 11.00 **V. Wiemken**
Conifer seedlings and mycorrhiza

Herbaceous vegetation

Model communities under controlled conditions

11.00 - 11.15 **J. Arnone, C. Kestenholz**
The role of root competition in a weed-crop model system under elevated CO_2

11.15 - 11.30 **J. Fuhrer, M. Meier**
The carbon balance of grass-clover mixtures

11.30 - 11.45 **P. Leadley, J. Stöcklin**
Genotypic responses in calcareous grassland microscosms under three CO_2 levels

11.45 - 12.00 **Ch. Körner, J. Stöcklin**
CO_2 x phosphate interaction in undisturbed calcareous grassland microcosms

12.00 - 13.30 **Lunch**

13.30 - 13.45 **J. Stöcklin, A. Kocyan, Ch. Körner**
Biodiversity and functional groups: designed grassland communities under elevated CO_2

13.45 - 14.00 **J. Stöcklin**
Effects of elevated CO_2 on sexual and vegetative reproduction in clonal plants

Friday, March 15 continued

Forest ecosystems

Spruce model ecosystems under controlled conditions

16.00 - 16.15 **S. Hättenschwiler, Ch. Körner**
Photosynthetic and growth responses of spruce to elevated CO_2 and increased N-deposition

16.15 - 16.30 **S. Hättenschwiler, F. Schweingruber**
Tree ring and wood quality responses

16.30 - 16.45 **V. Wiemken, A. Wiemken**
Mycrorrhiza responses

16.45 - 17.05 **Break**

17.05 - 17.20 **V. Wiemken, A. Wiemken**
Soil and rhizosphere responses

17.20 - 17.35 **K. Ineichen, V. Wiemken, A. Wiemken**
Nutrient and water balance

17.35 - 17.50 **S. Hättenschwiler**
Understory plant responses

17.50 - 18.05 **R. Siegwolf, S. Hättenschwiler**
Carbon isotope allocation

19.30 **Symposium dinner**

Saturday, March 16

Spruce-beech model ecosystems

09.00 - 09.10 **J. Bucher, Ch. Brunold, Ch. Körner**
General objectives of the COST-ICAT forest tree CO_2 enrichment project

09.10 - 09.25 **Ph. Egli**
Growth dynamics of beech and spruce

09.25 - 09.40 **P. Schocher, Ph. Egli**
Growth of understory plants

09.40 - 09.55 **S. Maurer**
Plant gas exchange under CO_2 enrichment

09.55 - 10.10 **M. Günthardt-Goerg**
Leaf structure responses

10.10 -10.25 **W. Landolt**
Leaf chemical responses

10.25 - 10.45 **Break**

10.45 - 11.00 **M. Sonnleitner, R. Schulin**
Ecosystem water relations

11.00 - 11.15 **J. Bucher**
Ecosystem nutrient balance

Mediterranean forests

11.15 - 11.30 **S. Hättenschwiler, F. Miglietta, A. Raschi, Ch. Körner**
Quercus ilex - lifetime responses of native mediterranean forest trees to elevated CO_2

Tropical forest ecosystems

11.30 - 11.45 **J. Arnone, Ch. Körner**
Model ecosystems with tropical rain forest species: CO_2 responses under fertile conditions

11.45 - 12.00 **J. Arnone, Ch. Körner**
Model ecosystems with tropical rain forest species: CO_2 responces under nutrient limited conditions

12.00 - 13.30 **Lunch**

13.30 - 13.45 **J. Arnone**
Canopy development in an extremely fast growing tropical species

13.45 - 14.00 **A. Kraft, J. Ascher**
Laboratory decomposition experiments with litter from an artificial tropical ecosystem

14.00 - 14.15 **H. Insam, U. Nussbaumer**
Responses of the soil microbiota to elevated CO_2 under nutrient limited conditions

14.15 - 14.30 **M. Würth, K. Winter, Ch. Körner**
In situ CO_2 responses of tropical understory plants in Panama

14.30 - 14.45 **M. Würth, Ch. Körner**
In situ tissue responses of top canopy leaves to CO_2 enrichment in a humid tropical forest

14.45 - 15.00 **G. Hirschel, J. Arnone, Ch. Körner**
A cross-biome comparison of high CO_2-grown leaf litter decomposition

15.00 - 15.30 **Break**

15.30 - 15.50 **Ch. Körner**
CO_2 enrichment effects under contrasting life conditions: What have we learned, where do we go from here?

Simulated grassland ecosystems on fertile soil

14.00 - 14.10 **J. Nösberger**
General objectives and approach of the Swiss FACE experiment

14.10 - 14.30 **A. Lüscher, Th. Hebeisen**
Effects of CO_2 management on a bi-species model ecosystem

14.30 - 14.50 **A. Lüscher**
Responses of genotypes of 12 grassland species to CO_2

14.50 - 15.10 **Break**

15.10 - 15.30 **S. Long**
Acclimation of leaf photosynthesis in perennial grassland species within the Swiss FACE experiment

15.30 - 15.50 **M. Frehner, B. Fischer**
Physiology of carbohydrates in the leaves of grassland species

15.50 - 16.10 **H. Blum**
Canopy development and litter production of *Lolium perenne*

16.10 - 16.30 **Ch. van Kessel**
Symbiotic N2-fixation enables increased C-sequestration in a grassland ecosystem within the Swiss FACE

16.30 - 17.00 **Break**

17.00 - 17.20 **W. Richner, U. Zimmermann, P. Stamp**
Below-ground responses of *Lolium perenne and Trifolium repens* to elevated CO_2

17.20 - 17.30 **J. Nösberger**
Synthesis and future plans of the Swiss FACE experiment at Eschikon

Mediterranean grassland

17.30 - 17.45 **Ch. Körner, F. Miglietta**
Mediterranean grasslands around natural CO_2 springs in Italy

Friday, March 15

Calcareous grassland ecosystems

9.00 - 9.10 **Ch. Körner**
General objectives of the calcareous grassland CO_2 project

09.10 - 09.25 **C. Lavigne, A. Birrer, M. Fischer, Th. Steinger, B. Schmid**
Evolutionary responses

09.25 - 09.40 **P. Leadley, Ch. Rötzel, M. Berger**
Biomass and diversity responses

09.40 - 09.55 **R. Stocker**
Ecosystem processes: CO_2 gas exchange and evapotranspiration

09.55 - 10.10 **Ch. Körner, S. Pelaez-Riedl, W. Lauber**
Species-specific physiological responses: tissue composition, stress resistance, stomatal behaviour

10.10 - 10.30 **Break**

10.30 - 10.45 **J. Arnone**
Fine root dynamics

10.45 - 11.00 **P. Niklaus**
Soil and microbial processes

11.00 - 11.15 **A. Alt, R. Streitwolf, M. van der Heijden**
Genetic diversity of arbuscular mycorrhizal fungal communities

11.15 - 11.30 **I. Sanders, A. Wiemken**
Plant - mycorrhiza interactions

11.30 - 11.45 **H. Zaller, J. Arnone**
Earthworm responses

12.00 - 13.30 **Lunch**

13.30 - 13.45 **K. Groppe, Th. Boller**
Plant - pathogen interactions

13.45 - 14.00 **B. Baur, S. Ledergerber**
Herbivory

14.00 - 14.15 **H. Rusterholz, A. Erhardt**
Nectar characteristiics and flowing phenology

Alpine grassland

14.15 - 14.25 **M. Diemer, Ch. Körner**
General objectives of the alpine grassland project

14.25 - 14.40 **B. Schäppi, Ch. Körner**
Biomass and biodiversity reponses

14.40 - 14.55 **M. Diemer**
Ecosystem processes: CO_2 gas exchange and water relations

14.55 - 15.15 **Break**

15.15 - 15.30 **J. Arnone**
Mineral nutrient availability in alpine grassland

15.30 - 15.45 **Ch. Thron, C. Lütz**
Effects on the photosynthetic apparatus

15.45 - 16.00 **R. Sage**
Photosynthetic adjustment at the biochemical leval

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