

# STAT40830 - Homework 1

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## Introduction

The R data set CO2 measures the rate of CO2 uptake in grass plants under different environmental conditions. It is a classic data set used in ecological and physiological research. We are interested in how the uptake rate changes with CO2 concentration for different grass types. The data set contains 84 observations of CO2 uptake across different ambient concentration.

## Exploring CO2 Uptake by Grass Type

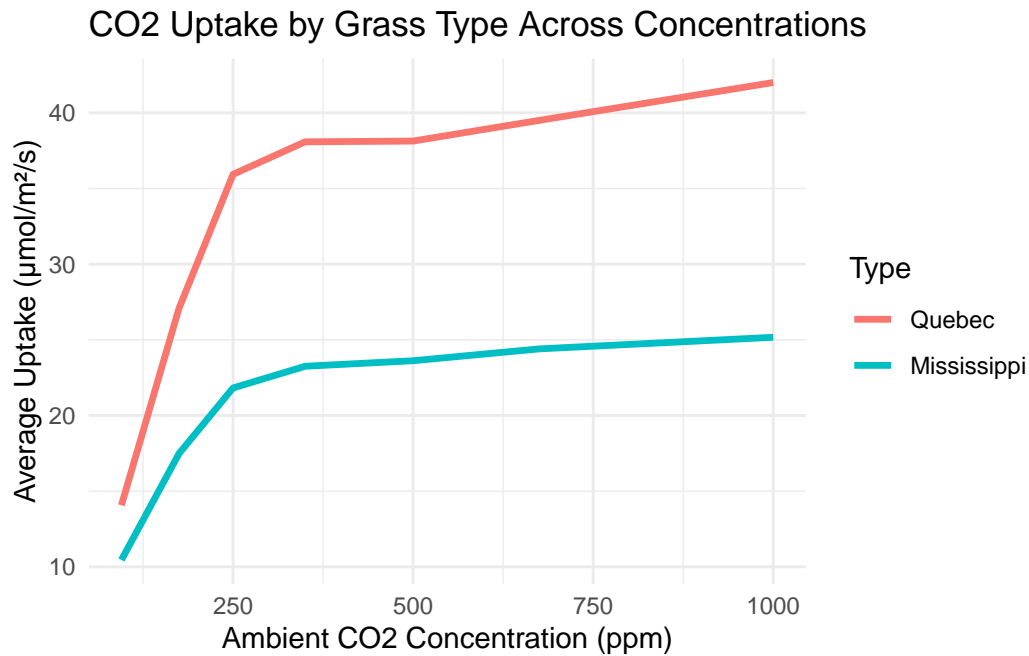
The CO2 dataset records carbon dioxide uptake in grass plants under varying conditions. It includes variables such as:

- Plant: ID
- Type: Grass type (Quebec or Mississippi)
- Treatment: Chilled or nonchilled
- conc: Ambient CO2 concentration
- uptake: CO2 uptake rate (response)

	Plant	Type	Treatment	conc	uptake
1	Qn1	Quebec	nonchilled	95	16.0
2	Qn1	Quebec	nonchilled	175	30.4
3	Qn1	Quebec	nonchilled	250	34.8
4	Qn1	Quebec	nonchilled	350	37.2
5	Qn1	Quebec	nonchilled	500	35.3
6	Qn1	Quebec	nonchilled	675	39.2

### Line Plot: Uptake vs CO<sub>2</sub> Concentration

Below is a line plot showing average uptake for each type at different concentration levels.



### Interpretation

- Plants from the two regions (*Quebec* and *Mississippi*) show increasing CO<sub>2</sub> uptake with concentration.
- At every CO<sub>2</sub> concentration level, both Quebec and Mississippi plants show increasing uptake, consistent with photosynthetic behavior.
- Quebec plants, exposed to generally warmer climates, may be physiologically adapted to higher efficiency, hence slightly higher CO<sub>2</sub> uptake at upper concentrations.
- This experiment highlights how plant physiology may adapt to environmental conditions.