



# Is the transpiration history of rice leaves indicative for the salt load of individual leaves?



Folkard Asch<sup>1</sup>, Keshav Dahal, Sankar Das

Institut für Pflanzenernährung, Karlrobert-Kreiten-Str. 13, 53113 Bonn  
email: fa@uni-bonn.de, web: <http://www.pitros.uni-bonn.de>

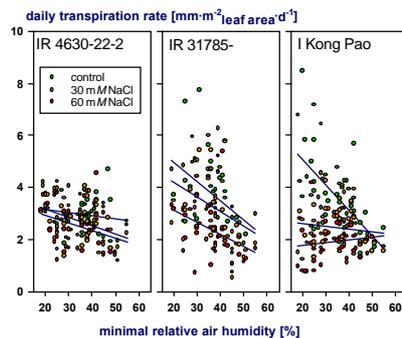
## Introduction

Transpiration is the driving force for passive sodium uptake to the shoots of rice plants. Theoretically, the amount of sodium accumulating in a rice leaf should be directly correlated with the amount of water lost from the leaf surface. Therefore, total sodium uptake should be related to the total amount of water transpired by the plant. Additionally, the sodium concentrations in each individual leaf should be correlated with the amount of water that passed through this leaf. It was shown that this is not true for sodium concentrations in rice leaf blades. In the ongoing work we will include sodium concentrations immobilised in the leaf sheaths.

## Conclusions

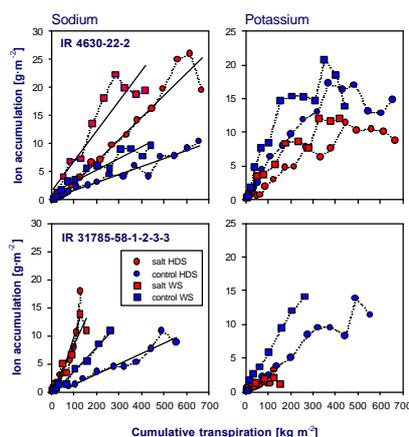
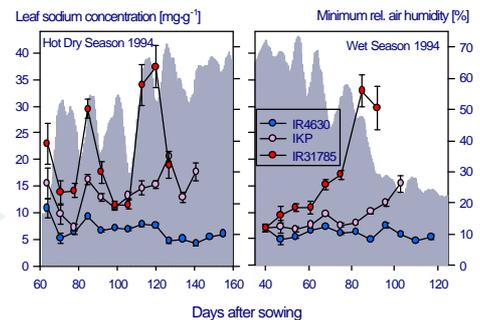
- ▄ Transpiration behavior changes in the presence of salt and relative humidity
- ▄ Without stomatal control, salt uptake to the leaves is strongly dependent on relative humidity
- ▄ Leaf sodium load is inversely related to leaf area and leaf age
- ▄ Analyses will show the relationship between leaf level transpiration, sodium accumulation and water lost from the leaf.

## Results - Summary



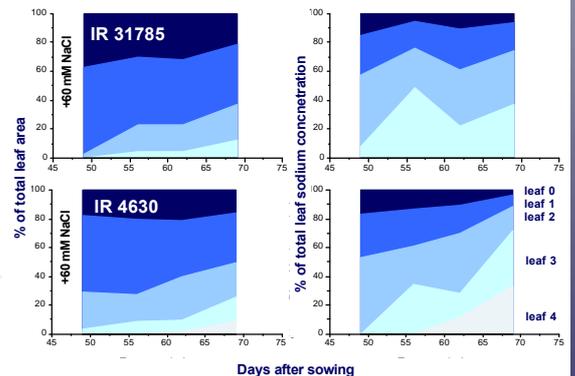
Leaf transpiration rate depends on genotypical stomatal control, atmospheric water demand and salinity level

Leaf sodium concentration is related to atmospheric water demand, but differs with genotype and season.



Overall plant sodium uptake is linearly correlated with the transpired volume, potassium uptake is transpiration independent

The oldest leaves have the smallest share in leaf area, but the largest share in sodium accumulation



## Notes on Materials and Methods



- ▄ various trials in fields, greenhouses and phytotrons
- ▄ between 2 and 54 genotypes involved
- ▄ six seasons and two levels of salinity in the fields
- ▄ hydroponic culture in greenhouses with varying levels of sodium and potassium concentrations
- ▄ analyses for Na, K (and Cl) in all organs
- ▄ leaf area, photosynthesis and water loss measurements
- ▄ yield, and yield component analyses

