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# Concept Models to Simulate Salinity Effects on Leaf Appearance, Duration and Transpiration in Rice

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**Abstract**

Rice varieties subjected to salinity have different strategies to cope with the stress. The most prominent strategies are avoidance or tolerance of critical salt levels in active tissues. More often, however, a combination of avoidance and tolerance traits is observed, due to the high agronomic performance desired of the cultivars in question. In this respect, the most critical question for the selection of salinity resistant rice varieties is, apart from agronomical considerations, how does the plant cope with the salt that it could not avoid taking up? Here two considerations are important: (1) what is the individual salt-threshold of any tissue? And (2) what are the dilution factors for any tissue the plant can achieve through growth of the particular organ. Assuming, that the resulting concentration of sodium in any tissue is directly related to the amount of water that passed through the tissue and knowing, that the root is no sink for sodium but the leaf sheaths are, we developed a model simulating water and sodium uptake into a growing rice plant. Concepts for the effects of salinity on growth and appearance rate of individual leaves were developed from our ongoing work on salinity in rice. Contributions of individual leaves to the overall water-use of a rice plant were simulated for saline and non-saline conditions on the basis of individual leaf area, transpiration and duration of the leaf. Preliminary results show, that the salt-resistant variety used less water during the trial than the salt susceptible one, on both total leaf area basis and on individual leaf area basis. The concepts and results will be discussed.

**Keywords:** Modelling, potassium nutrition, salt distribution, salt uptake, sodium retention

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