Bul. Agron. 23(3): 28 - 33 (1995)

SALT TOLERANCE OF TURFGRASS *Puccinellia distans*: II. IONIC INTERACTION IN THE ROOTS[1)]

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ABSTRACT

In this study, multi-compartment transport boxes were used to determine the mobility of ions in the execised roots. For measuring Na uptake, the concentrations of 1, 50 and 150 mM NaCl were used in the external medium, whilst Ca were 0 and 2.0 mM. The uptake of K was measured from 1.0 mM KCl in the presence of Na (0.50 and 150 mM) and Ca (0, 0.5 and 2.0 mM). In the present study, ^{22}Na and ^{86}Rb were used to label Na and K in the external medium, respectively.

Addition of Ca inhibited Na uptake in the roots exposed to 1.0 mM and 50 mM NaCl, thought Ca was relatively less effective in 150 mM. High concentrations of NaCl brought about the reduction of K uptake. Calcium, however, did not show any importance in recovering the uptake of K from the adverse effect of Na when the roots were exposed to 50 mM NaCl, thought stimulating effect of Ca was observed at 150 mM NaCl. The results revealed that the pattern of ionic interactions in Puccinellia distans differs much with that generally found in most of halophyte plants.

RINGKASAN

Pada penelitian ini, mobilitas ion pada potongan akar ditentukan dengan menggunakan *multi-compartment transpor box.* Untuk pengukuran serapan Na, konsentrasi NaCl pada medium adalah 1, 50 dan 150 mM, sedangkan konsentrasi Ca adalah 0 dan 2.0 mM. Serapan K diukur dari 1.0 mM KCl dengan perlakuan pemberian Na (0, 50 dan 150 mM) dan Ca (0 dan 2.0 mM). Untuk melabel Na dan K dipergunakan masing-masing ^{22}Na dan ^{86}Rb.

Pemberian Ca menghambat serapan Na pada kondisi 1.0 mM dan 50 mM NaCl, walaupun Ca tidak efektif lagi pada konsentrasi 150 mM NaCl. Serapan K menurun dengan meningkatnya konsentrasi NaCl pada larutan medium. Pemberian Ca kurang efektif dalam mengurangi pengaruh buruk Na terhadap serapan K pada saat akar diberi cekaman 50 mM NaCl, walaupun pengaruhnya terlihat pada konsentrasi 150 mM NaCl. Hasil menunjukkan bahwa pola interaksi ion pada akar *P. distans* sangat berbeda dengan pola yang umum ditemui pada kebanyakan tanaman halofita.

INTRODUCTION

Our previous work concerning the salt tolerance of turfgrass *Puccinellia distans* (Part I), a halophytic monocotyledon plant, revealed that its tolerance was apparently associated with exclusion of Na from the shoot. The result was in agreement with that previous postulated mechanism proposed by Gorham *et al.* (1989) and Austin (1984). However, the mechanism of tolerance of this halophytic monocotyledon in term of ionic interactions (Na, K, Ca) has not been elucidated.

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