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Studies on the Mechanism of Salt Tolerance in *Salicornia europaea* L. : III. Salt accumulation and ACh function

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Abstract:

A basic understanding of the mechanism of salt stress tolerance in plants is crucial to the utilization of salt tolerant crop varieties. The present work was an investigation of NaCl accumulation at the organ level in *Salicornia* plants. Acetylcholinesterase (AChE) activity in various different organs was also determined, by chemical and histochemical methods, in order to determine the possibility that acetylcholine (ACh) functions in Na⁺ and Cl⁻ transport between organelles. High NaCl accumulation occurred in roots and in lower stems. At 5 months after germination, *Salicornia* plants had accumulated approximately 160 nmol and 320 nmol/100 g fresh weight of Na⁺ and Cl⁻ respectively in roots. High AChE activity was also observed in roots and in lower stems. The enzyme activity in stems was higher at nodes than internodes. Histochemically, AChE activity in roots was detected in the cortex, including endodermal cells around the vascular system, and strongly in endodermis, cortex and epidermis at the parting portion of lateral root from the main root. In stems, AChE activity was detected in endodermal cells around the vascular system and concentratively at the node connected with the branch in the stem. These results suggest the possibility that ion transport at the node connected with the branch in the stem, and the parting portion of the lateral root from the main root is facilitated by ACh function. Furthermore, excessive NaCl may be excreted through the epidermal cells of roots.

Keywords:

Accumulation of NaCl, AChE activity, ACh function, Halophyte, *Salicornia*, Salt tolerance

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