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# Survival of *Atriplex leucoclada* Bioss at Saline Habitats

Sayed Hussin[1], Hans-Werner Koyro[1], Samy Habib[2]

[1] *Justus-Liebig-University Giessen, Institute for Plant Ecology, Germany*
[2] *Ain Shams University, Dept. of Agricultural Botany, Egypt*

**Abstract**

Sustainability of intensive irrigated agriculture in Egypt has become a critical issue, as the land and water resources are limited on one hand and population is increasing rapidly on the other hand. The sustainable use of halophytic plants is a promising approach to valorise strongly salinised zones unsuitable for conventional agriculture and mediocre waters. There are already many halophytic species used for economic interests (e.g. fodder, human food) or ecological reasons (soil desalinisation, dune fixation, $CO_2$-sequestration). However, the wide span of halophyte utilisation is not jet explored to a small degree.

A precondition for a sustainable utilisation of suitable halophytes such as *Atriplex* ssp. is a precise knowledge about the various mechanisms (physiological mechanisms and morphological structures) countering the dual hazard of water deficit and ion toxicity. Chenopodiaceae was studied in a quick check system (QCS, up to 150 % seawater salinity).

NaCl induced growth stimulation of *Atriplex leucoclada* which was optimal at moderate salinities (125 — 250 mM) NaCl. Atriplex was able to survive NaCl salinity up to more than 100 % seawater salinity.

NaCl salinity generally induced a decrease of $CO_2$ assimilation but a growth stimulation and also an increase of the water content up to 50 % sws. NaCl salinity induced a significant accumulation of Na especially in the adult leaves and a decrease in the content of essential nutrients such as K, Ca and Mg in all plant parts. Accumulation of inorganic ions seems to be involved in the osmotic adjustment. The surplus of NaCl was excreted via salt hairs.

An increase of the total soluble protein was observed with increasing salinity. Further investigations are necessary especially at the molecular level in order to understand the influence of NaCl on the protein composition.

Our results indicate that *A. leucoclada* can be grown productively at moderate salinity.

**Keywords:** Atriplex, cash crop halophyte, gas exchange, growth, NaCl salinity, sustainable use, water relations

**Contact Address:** Sayed Hussin, Justus-Liebig-University Giessen, Institute for Plant Ecology, Germany, e-mail: sayed_hussin@hotmail.com