

Text S1 The detailed design and operation of the wetland beds

About 10 cm depth of sediment was placed in per simulated wetland bed and 10 cm depth of designated salt solution was added above the surface of sediment. Each simulated wetland bed was separated by plastic barriers in order to independent growth of plant. Small holes were set up in the upper part (above sediment surface) of the barriers to ensure a similar environment. During the experiment, the new solution was added to the wetland bed every five days in order to maintain the stability of growth conditions.

Text S2 The detailed process of measuring ion contents

About 0.2 g of dry sample was digested with a mixture of 1 mL HClO₄ and 10 mL HNO₃ and was heated over a programmable heating block for 12 h until a clear digestion solution was obtained. The digestion solution was diluted to a constant volume of 25 mL with deionized water. The Na⁺ and K⁺ content in dry sample were determined by 932 atomic absorption spectrophotometer (GBC Scientific Equipment Pvt. Ltd., Melbourne, Australia).

Text S3 Speed of germination of tested plants observed under different treatments

In the growth chamber, under saline stress (Figure S1I), the speed of germination of *A. tatarinowii* and *T. orientalis* significantly ($p < 0.05$) decreased with the salinity increase (i.e., EC from 0 to 7.5 dS/m). In addition, the speed of germination dropped to 0 under high saline stress (EC of 10 and 15 dS/m). For *L. salicaria* and *I. sibirica*, the highest speed of germination occurred in 7.5 and 5 dS/m treatments, respectively. Under saline-alkaline stress (Figure S1II), the speed of germination of the four tested plant species significantly ($p < 0.05$) decreased with increasing saline-alkaline treatment, especially for *T. orientalis* when the speed of germination was completely inhibited even with an electrical conductivity (EC) of only 5 dS/m.

The speed of germination under saline-alkaline stress in soil pots is shown in Figures S1III and S1IV. Saline stress significantly ($p < 0.05$) reduced the speed of germination of the four tested plant species compared to control. Under saline-alkaline stress (Fig S1IV), the highest speed of germination of *I. sibirica*, *L. salicaria* and *T. orientalis* was observed in the treatment with an EC of 5, 7.5 and 5 dS/m, respectively. Lower or higher saline-alkaline treatments significantly ($p < 0.05$) reduced the speed of germination of each respective plant species.

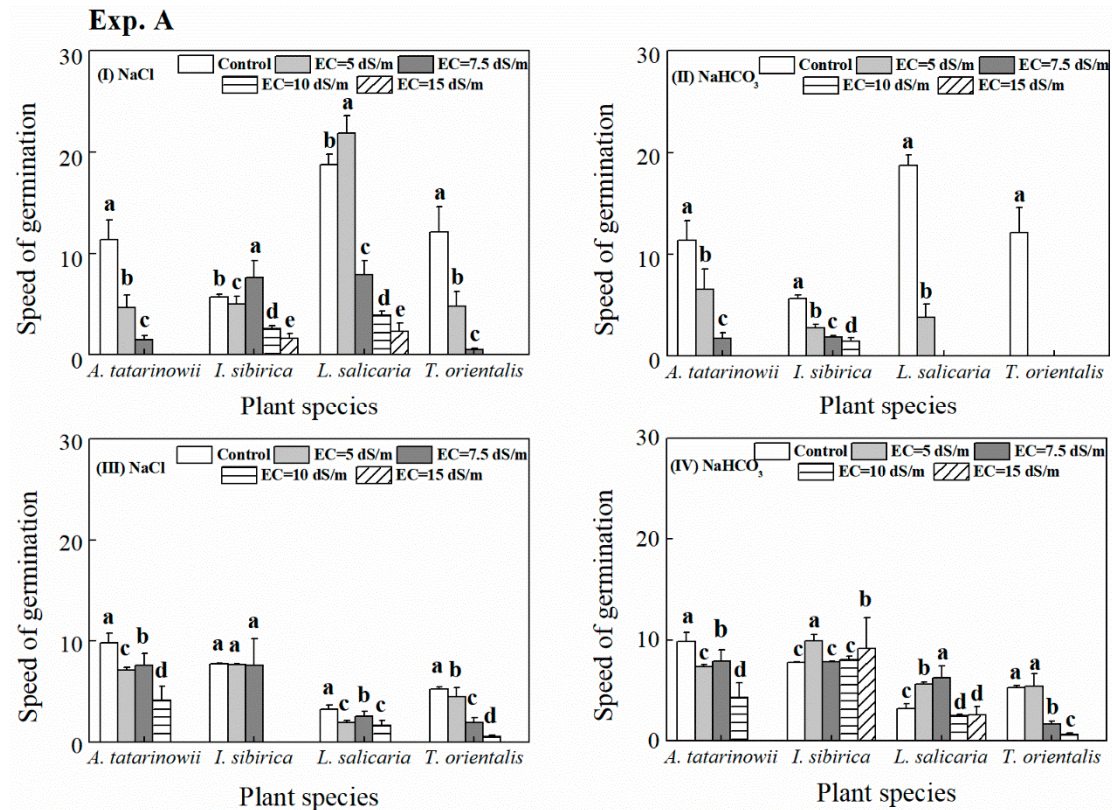


Figure S1 Speed of germination of tested plants observed under different treatments (I, II: growth chamber; III, IV: soil pots). The absence of column indicates no germination occurred in these treatments.

Text S4 Ionic absorption of seedlings in soil pot experiment

Under saline stress (Figure S2I), the average Na⁺ contents of *A. tatarinowii*, *I. sibirica*, *L. salicaria* and *T. orientalis* were 48, 26, 21 and 58 mg/g DW, respectively. The presence of salt significantly ($p < 0.05$) increased Na⁺ absorption by all plant species compared to the control. Under saline-alkaline stress (Figure S2IV), the average Na⁺ contents of *A. tatarinowii*, *I. sibirica*, *L. salicaria* and *T. orientalis* were 48, 59, 24 and 56 mg/g DW, respectively. For *A. tatarinowii* and *L. salicaria*, saline-alkaline stress significantly ($p < 0.05$) promoted the Na⁺ absorption by seedlings compared to control. For *T. orientalis*, the Na⁺ contents in seedlings significantly ($p < 0.05$) increased at EC of 7.5 and 10 dS/m. For *I. sibirica*, the Na⁺ content in seedlings at EC of 10 and 15 dS/m were significantly ($p < 0.05$) higher than in other treatments.

The K⁺ absorption by seedlings is shown in Figure S3II and S3V. Under saline stress (Figure S2II), the average K⁺ contents of *A. tatarinowii*, *I. sibirica*, *L. salicaria* and *T. orientalis* was approximately 8.6, 10.0, 2.2 and 5.3 mg/g DW, respectively. For *A. tatarinowii* and *L. salicaria*, the increasing salinity levels significantly ($p < 0.05$) reduced K⁺ contents. For *L. salicaria*, there was no significant difference in K⁺ contents among control and EC from control and EC of 5, 7.5 and 10 dS/m. K⁺ contents of *T. orientalis* were significantly ($p < 0.05$) decreased with the increasing salinity treatment. Under saline-alkaline stress (Figure S2V), K⁺ contents of *A. tatarinowii*, *I. sibirica*, *L. salicaria* and *T. orientalis* were approximately 9.0, 13.0, 2.8 and 5.7 mg/g DW, respectively. For *A. tatarinowii*, *I. sibirica* and *T. orientalis*, the highest K⁺ contents were observed at EC of 5, 10 and 5 dS/m, respectively. K⁺ contents of *L. salicaria* at EC of 5, 7.5

and 10 were significantly ($p < 0.05$) higher than other treatments and there was no significant difference among EC of 5, 7.5 and 10 dS/m treatments

The change of Na^+/K^+ ratios in seedlings was calculated and presented in Figure S2III and S2VI. Under saline stress (Figure S2III), Na^+/K^+ ratios in all tested plant species significantly ($p < 0.05$) increased with salinity levels increased. Under saline-alkaline stress (Figure S2VI), Na^+/K^+ ratios of *A. tatarinowii* and *T. orientalis* significantly increased ($p < 0.05$) with increasing saline-alkaline levels. Na^+/K^+ ratios in *I. sibirica* at EC of 15 and 20 dS/m were significantly ($p < 0.05$) higher than other treatments. The maximum Na^+/K^+ ratios in *L. salicaria* under saline-alkaline stress was observed at an EC of 5 dS/m.

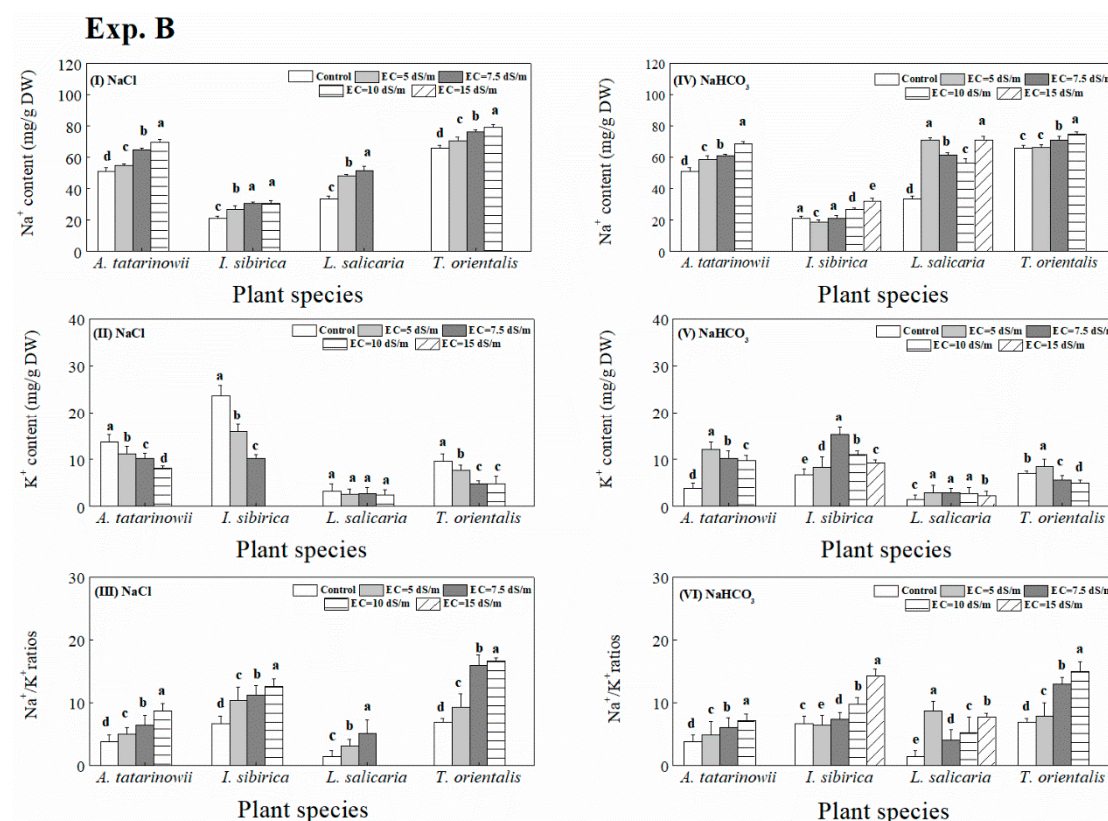


Figure S2 Na^+ and K^+ contents (I, IV, II and V) and Na^+/K^+ ratios (III, VI) of wetland plant seedlings under saline and alkaline stress. The absence of column indicates no seedlings growth data obtained in these treatments due to the unsuccessful germination.