**SUPPLEMENTAL INFORMATION FOR:**

**Salinity tolerance of aquatic plants indicated by monitoring data from the Netherlands**

Willem Kaijser1, 2

Sarian Kosten1

Daniel Hering2

*Department of Aquatic Ecology and*

*Environmental Biology, Institute for Water*

*and Wetland Research, Radboud University,*

*Heyendaalseweg 135, 6525AJ Nijmegen, The*

*Netherlands*

1Department of Aquatic Ecology and Environmental Biology, Institute for Water and Wetland Research, Radboud University, Heyendaalseweg 135, 6525 AJ Nijmegen, The Netherlands

2Department of Aquatic Ecology, University of Duisburg-Essen, Universitätsstr. 5, 45141 Essen, Germany

Table S1. Summary of values describing salinity optima and ranges in mg l-1. Total number of records (n), number of classes in which a taxon occurred (cf), species optimum (S) in mg l-1, modified chi-square (MX2), minimum (min) and maximum (max) salinity of occurrence in mg l-1 and the class at which the Change Point (CP) occurred.

| ***Taxon*** | **n** | **cf** | **S** | **MX2** | **min** | **max** | **CP** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *Alisma plantago-aquatica* | 25 | 4 | 325 | 0.29 | 20 | 650 | 0-199 |
| *Aster tripolium* | 78 | 39 | 12733 | 0.05 | 1100 | 18500 | 5200-5399 |
| *Azolla filiculoides* | 18 | 7 | 1040 | 0.18 | 180 | 1800 | 600-799 |
| *Bolboschoenus maritimus* | 278 | 45 | 5760 | 0.01 | 81 | 11000 | 5200-5399 |
| *Callitriche* spp. | 140 | 10 | 867 | 0.10 | 35 | 1900 | 800-999 |
| *Carex otrubae* | 137 | 32 | 4804 | 0.05 | 82 | 8500 | 4000-4199 |
| *Carex riparia* | 19 | 2 | 141 | 0.59 | 25 | 275 | 0-199 |
| *Ceratophyllum demersum* | 59 | 8 | 653 | 0.13 | 34 | 1527.9 | 600-799 |
| *Ceratophyllum submersum* | 22 | 8 | 1033 | 0.12 | 54 | 1900 | 400-599 |
| *Elodea canadensis* | 27 | 3 | 282 | 0.32 | 30 | 510 | 0-199 |
| *Epilobium hirsutum* | 274 | 29 | 3332 | 0.03 | 45 | 6200 | 3000-3199 |
| *Glaux maritima* | 21 | 17 | 17277 | 0.09 | 710 | 24000 | 400-599 |
| *Glyceria fluitans* | 7 | 2 | 333 | 0.49 | 55 | 590 | 0-199 |
| *Glyceria maxima* | 14 | 3 | 237 | 0.37 | 67 | 500 | 200-399 |
| *Glyceria notata* | 6 | 2 | 177 | 0.54 | 56 | 250 | 0-199 |
| *Iris pseudacorus* | 106 | 8 | 695 | 0.14 | 17 | 1600 | 400-599 |
| *Juncus articulatus* | 18 | 6 | 684 | 0.22 | 21 | 1200 | 400-599 |
| *Juncus effusus* | 41 | 4 | 382 | 0.29 | 29 | 1000 | 0-199 |
| *Juncus gerardii* | 59 | 39 | 13989 | 0.05 | 280 | 22000 | 5800-5999 |
| *Juncus inflexus* | 93 | 22 | 3401 | 0.04 | 53 | 8300 | 2600-2799 |
| *Lemna gibba* | 12 | 4 | 1135 | 0.29 | 50 | 21689 | 200-399 |
| *Lemna minor* | 341 | 23 | 2166 | 0.03 | 36 | 4500 | 1000-1199 |
| *Lemna minuta* | 6 | 2 | 163 | 0.58 | 94 | 250 | 0-199 |
| *Lemna trisulca* | 89 | 10 | 835 | 0.10 | 35 | 1900 | 1200-1399 |
| *Mentha aquatica* | 88 | 8 | 844 | 0.13 | 29 | 1800 | 0-199 |
| *Myriophyllum spicatum* | 21 | 5 | 561 | 0.21 | 29 | 1200 | 200-399 |
| *Nuphar lutea* | 6 | 1 | 92 | 0.99 | 43 | 140 | 0-199 |
| *Nymphaea alba* | 26 | 3 | 195 | 0.45 | 40 | 420 | 0-199 |
| *Phragmites australis* | 764 | 51 | 5785 | 0.01 | 4 | 11000 | 2200-2399 |
| *Potamogeton crispus* | 15 | 4 | 421 | 0.28 | 30 | 740 | 400-599 |
| *Potamogeton pusillus* | 31 | 7 | 778 | 0.16 | 30 | 1300 | 600-799 |
| *Potamogeton trichoides* | 5 | 1 | 69 | 0.99 | 29 | 130 | 0-199 |
| *Ranunculus aquatilis* | 11 | 4 | 392 | 0.26 | 34 | 780 | 0-199 |
| *Ranunculus sceleratus* | 50 | 15 | 3515 | 0.10 | 38 | 6800 | 1200-1399 |
| *Rumex hydrolapathum* | 26 | 4 | 385 | 0.24 | 25 | 800 | 200-399 |
| *Ruppia cirrhosa* | 21 | 17 | 11218 | 0.09 | 700 | 18000 | 2400-2599 |
| *Ruppia maritima* | 5 | 5 | 11747 | 0.37 | 7100 | 13768 | 600-799 |
| *Salicornia* spp. | 31 | 24 | 16148 | 0.06 | 1650 | 24000 | 2600-2799 |
| *Schoenoplectus lacustris* | 35 | 11 | 1474 | 0.09 | 34 | 3100 | 600-799 |
| *Sparganium erectum* | 19 | 2 | 131 | 0.68 | 20 | 330 | 0-199 |
| *Stuckenia pectinata* | 59 | 17 | 2805 | 0.08 | 64 | 4700 | 2000-2199 |
| *Typha angustifolia* | 69 | 9 | 2230 | 0.12 | 38 | 7200 | 1400-1599 |
| *Typha latifolia* | 46 | 8 | 820 | 0.14 | 36 | 1600 | 1000-1199 |
| *Ulva spp.* (=filamentous) | 229 | 48 | 6507 | 0.02 | 130 | 11500 | 3600-3799 |
| *Ulva* spp. (=non-filamentous) | 14 | 10 | 14007 | 0.30 | 5200 | 17000 | 1600-1799 |
| *Zannichellia* spp. | 31 | 13 | 2856 | 0.10 | 51 | 7200 | 1400-1599 |

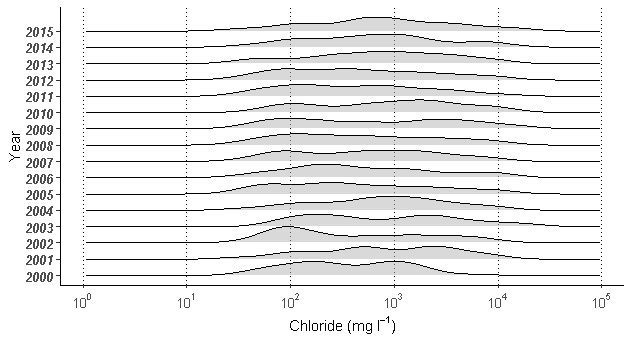


Figure S1. Yearly distribution of vegetation samples along the salinity gradient as a ridge plot, ggridges (O. Wilke, 2017). On the y axes the relative number of locations sampled at a certain chloride concentration with respect to all samples taken in a certain year are shown. On the left and right side of the grey are, no vegetation samples were taken.

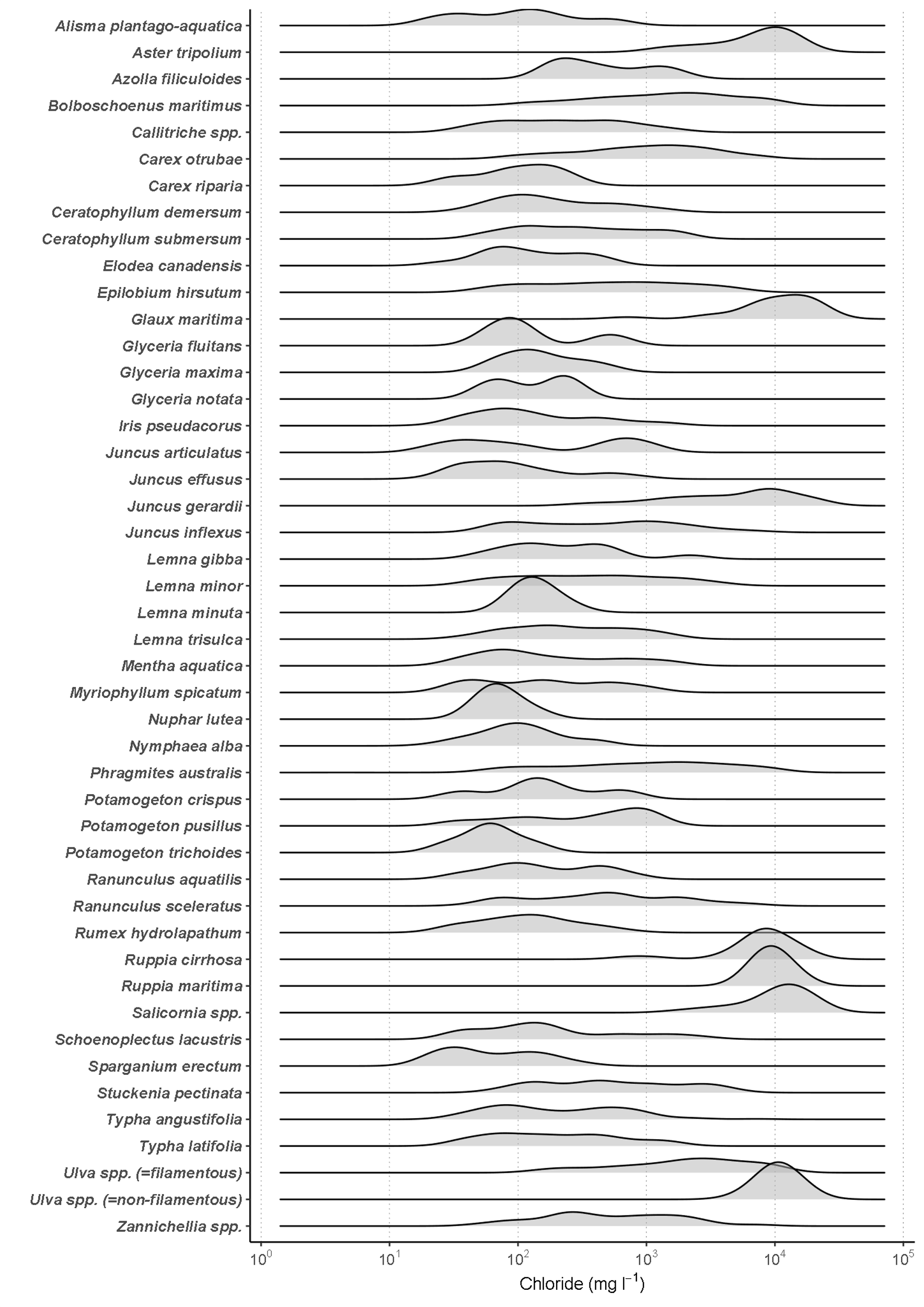


Figure S2. Salinity distribution of the different taxa found during this study in the form of a ridge plot (O. Wilke, 2017). The figure displays density based distributions, where the highest location under the grey line represents the location where the highest density of the specific taxon were found. Flat lines with no grey area indicate locations without occurrences.

Table S2. The upper salinity limit (95% percentile) found in this study, compared with maximum values reported in literature. The values are expressed as the concentration of chloride in mg l-1 Cl-. Bold numbers are the highest upper limit.

|  |  | This analysis | Literature | |
| --- | --- | --- | --- | --- |
| **Taxa** | **n** | **Max (95%)** | **Highest**  **value** |  |
| *Alisma plantago-aquatica* | 25 | 650 | 1781  203  1,6502#  **4,510**2 | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990)  (Remane and Schlieper, 1972)  (Altınsaçlı et al., 2014) |
| *Aster tripolium* | 78 | 18,500 | 6,6002  11,1652  17,7501\*  **19,809**1\* | (Noordwijk-Puijk et al., 1979)  (Fitzgerald et al., 2003)  (Duarte et al., 2017)  (Shennan et al., 1987) |
| *Azolla filiculoides* | 18 | 1,800 | 830  1,775\*  **4,260**\* | (Barendregt et al., 1990)  (Masood et al., 2006)  (van Kempen et al., 2013) |
| *Bolboschoenus maritimus* | 278 | 11,000 | 1,6502  1,9484  9,9002\*  16,5002\*  **19,2502** | (Antonellini and Mollema, 2010)  (Bouzillé et al., 2001)  (Hootsmans and Wiegman, 1998)  (Lillebø et al., 2003)  (Lillebø et al., 2003) |
| *Callitriche* spp. | 140 | 1,900 |  |  |
| *Carex otrubae* | 137 | **8,500** | 3074  1,6502  6,6002 | (Bouzillé et al., 2001)  (Antonellini and Mollema, 2010)  (Noordwijk-Puijk et al., 1979) |
| *Carex riparia* | 19 | 250 | 281  6664  **1,650**2 | (Barendregt et al., 1990)  (Bouzillé et al., 2001)  (Antonellini and Mollema, 2010) |
| *Ceratophyllum demersum* | 59 | 1,528 | 478  1,7751#  2,7502  3,2452#  **3,660**3\* | (Barendregt et al., 1990)  (Martinez-Taberner and G., 1993)  (Izzati, 2015)  (Remane and Schlieper, 1972)  (Hinojosa-Garro et al., 2008) |
| *Ceratophyllum submersum* | 22 | 1,700 | 7461#  **2,337** | (Martinez-Taberner and G., 1993)  (Barendregt et al., 1990) |
| *Elodea canadensis* | 27 | 510 | 1781  237  440  1,3752#  **1,650**\* | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990)  (Cegłowska et al., 2017)  (Remane and Schlieper, 1972)  (Thouvenot and Thiébaut, 2018) |
| *Epilobium hirsutum* | 274 | 6,200 | **6,6002** | (Noordwijk-Puijk et al., 1979) |
| *Glaux maritima* | 21 | **22,000** | 10,6501\* | (Rozema, 1975) |
| *Glyceria fluitans* | 7 | 590 | 487  **859**4 | (Barendregt et al., 1990)  (Bouzillé et al., 2001) |
| *Glyceria maxima* | 14 | 460 | 187  **6052** | (Barendregt et al., 1990)  (Lambert, 1946) |
| *Glyceria notata* | 6 | **250** |  |  |
| *Iris pseudacorus* | 106 | 1,600 | 1781  182  6602  666**4**  **3,050**3\* | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990)  (Engi̇n et al., 1998)  (Bouzillé et al., 2001)  (Zhao et al., 2015) |
| *Juncus articulatus* | 18 | **1,200** | 1781  6664 | (Lyon and Roelofs, 1986)  (Bouzillé et al., 2001) |
| *Juncus effusus* | 41 | 840 | 107 1  **6,050**2 | (Lyon and Roelofs, 1986)  (Mendelssohn and Marcellus, 1976) |
| *Juncus gerardii* | 59 | 22,000 | 1,3734  6,0502  **48,800**3\* | (Bouzillé et al., 2001)  (Mendelssohn and Marcellus, 1976)  (Crain et al., 2004) |
| *Juncus inflexus* | 93 | **7,200** |  |  |
| *Lemna gibba* | 12 | **2,168** | 500 | (Barendregt et al., 1990) |
| *Lemna minor* | 341 | 4,500 | 3201  520  1,3752#  **8,250**2 | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990)  (Remane and Schlieper, 1972)  (Izzati, 2015) |
| *Lemna minuta* | 6 | **250** |  |  |
| *Lemna trisulca* | 89 | **1,900** | 617 | (Barendregt et al., 1990) |
| *Mentha aquatica* | 88 | 1,800 | **3,112** | (Barendregt et al., 1990) |
| *Myriophyllum spicatum* | 21 | 1,200 | 696  2,0084#  2,5921#  5,5002  **6,6002**\* | (Barendregt et al., 1990)  (Grillas, 1990)  (Martinez-Taberner and G., 1993)  (Izzati, 2015)  (Twilley and Barko, 1990) |
| *Nuphar lutea* | 6 | 140 | 1781  180  **1,3752#** | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990)  (Remane and Schlieper, 1972) |
| *Nymphaea alba* | 26 | 400 | 171  1781  **1,265**2# | (Barendregt et al., 1990)  (Lyon and Roelofs, 1986)  (Remane and Schlieper, 1972) |
| *Phragmites australis* | 764 | 11,000 | 3201  1,9484  2,001  4,510  9,9002\*  12,000  **16,500**2\* | (Lyon and Roelofs, 1986)  (Bouzillé et al., 2001)  (Barendregt et al., 1990)  (Fitzgerald et al., 2003)  (Hootsmans and Wiegman, 1998)  (Hart et al., 1991)  (Medeiros et al., 2013) |
| *Potamogeton crispus* | 15 | 700 | 1781  195  **2,095**1# | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990)  (Martinez-Taberner and G., 1993) |
| *Potamogeton pusillus* | 31 | **1,300** | 648  1,2524# | (Barendregt et al., 1990)  (Grillas, 1990) |
| *Potamogeton trichoides* | 5 | 130 | **835** | (Barendregt et al., 1990) |
| *Ranunculus aquatilis* | 11 | **480** | 108 | (Barendregt et al., 1990) |
| *Ranunculus sceleratus* | 50 | **6,800** | 1781  1,1002\* | (Lyon and Roelofs, 1986)  (Baldwin et al., 1996) |
| *Rumex hydrolapathum* | 26 | **800** | 1781  275 | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990) |
| *Ruppia cirrhosa* | 21 | 18,000 | 6,5444#  **23,324**1 | (Grillas, 1990)  (Martinez-Taberner and G., 1993) |
| *Ruppia maritima* | 5 | 13,768 | 3,5752#  13,7502  17,5064#  **24,424**1 | (Herkül et al., 2018)  (Izzati, 2015)  (Moreno et al., 2001)  (Martinez-Taberner and G., 1993) |
| *Salicornia* spp. | 31 | 21,000 | 7,7552  21,300\*  **23,592**4 | (Antonellini and Mollema, 2010)  (Muscolo et al., 2014)  (Piernik, 2003) |
| *Schoenoplectus lacustris* | 35 | 3,100 | 2,088  **9,9002\*** | (Barendregt et al., 1990)  (Hootsmans and Wiegman, 1998) |
| *Sparganium erectum* | 19 | 330 | 1781  204  **666**4 | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990)  (Bouzillé et al., 2001) |
| *Stuckenia pectinata* | 59 | 4,700 | 1,909  3,0181#  3,5752#  2,0084#  **8,056**4# | (Barendregt et al., 1990)  (Martinez-Taberner and G., 1993)  (Herkül et al., 2018)  (Grillas, 1990)  (Moreno et al., 2001) |
| *Typha angustifolia* | 69 | 7,200 | 1781  203  **24,400**3\* | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990)  (Crain et al., 2004) |
| *Typha latifolia* | 46 | 1,600 | 1781  216  9,9002\*  **13,2002\*** | (Lyon and Roelofs, 1986)  (Barendregt et al., 1990)  (Hootsmans and Wiegman, 1998)  (Jesus et al., 2014) |
| *Ulva* spp. (=filamentous) | 229 | 11,500 | 17,5064#  **56,1002#** | (Moreno et al., 2001; *Enteromorpha intestinalis*)  (Reed and Russell, 1979; *Enteromorpha intestinlis*) |
| *Ulva* spp. (=non-filamentous) | 14 | 17,000 | 18,5002\*  **70,4002\*** | (Dickson et al., 1982; *Ulva lactuca*)  (Xia et al., 2004; *Ulva lactuca*) |
| *Zannichellia* spp. | 31 | 7,200 | 2,029  4,0602#  **10,000\*** | (Barendregt et al., 1990; *Zannichellia palustris*)  (Herkül et al., 2018; *Zannichellia palustris*)  (Van Vierssen, 1982; *Zannichelia palustris, Zannichellia pedunculata*) |

“1” indicates conversion of mmol l-1 to mg l-1,“2” indicates the conversion from mg seawater salt to mg Cl-, “3” indicates the conversion from mg NaCl to mg Cl-,“4” indicates conversion from ms cm-1 to mg l-1 Cl- , “\*” indicates results from laboratory experiments, “#” data extracted from plot with “WebPlotDigitizer” (Rohatgi, 2018). Data extracted from (Remane and Schlieper, 1972) was originally published by Luther (1951), yet this was inaccessible. Note that maximum ranges by laboratory experiments do not correspond to the natural distribution in the environment.

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