**Supplementary Material**

**S1 – Search strings for systematic literature search**

1. ISI Web of Science:

Date of search: 13.04.2018

Search String:

(marine OR brackish OR estuar\* OR coastal OR sea OR lagoon\* OR benth\* OR demersal OR shore\* OR intertidal OR subtidal OR ocean\* OR bay\* OR cove\* OR harbo\* OR lake\* OR pond\* OR bog\* OR stream\* OR river\* OR freshwater\* OR creek\* OR lotic OR lentic OR headwater\* OR reservoir\* OR brook\* OR wetland\* OR \*pool\* OR marsh\* OR watershed\* OR catchment\* OR limnol\* OR glacial\* OR "inland waters")

AND (invertebrate OR macrofauna NOT plankton OR sponge OR porifera OR anthozo\* OR anemone OR coral OR cnidaria\* OR mollus\* OR bivalv\* OR gastropod\* OR clam OR mussel OR snail OR slug OR polyplacophora OR cephalopod\* OR polychaete OR worm OR annelid\* OR chaetognat\*OR entrproct\* OR gastrotrich\* OR hairyback OR hemichordat\* OR kinorynch\* OR "mud dragon" OR arthropod\* OR nematod\* OR nematomorph\* OR nemert\* OR phoronid\* OR plathelminth\* OR flatworm OR priapulid\* OR sipuncul\* OR xenacoelomorph\* OR brachiopod\* OR lampshells OR bryozo\* OR "moss animal" OR "sea mat" OR ectoproct OR chordat\* OR tunicat\* OR urochordat\* OR caphalochordat\* OR lancelet\* NOT teleost NOT mammal\* NOT amphib\* NOT reptile NOT vertebrat\* OR insect\* OR echinoderm\* OR "sea star" OR "sea urchin" OR "sea cucumber" OR "feather star" OR crinoid\* OR comatulid\* OR "sand dollar" OR "sea lil\*" OR "brittle star" OR crustac\*)

AND (salin\* OR "salt stress" OR osmolality OR osmotic OR osmolarity OR isoosmo\* OR hypoosmo\* OR osmoregulat\* OR osmoconform\*)

AND ( "Free amino acid" OR "amino acid" OR Methylamin\* OR "methylated ammonium" OR Calcium OR Magnesium OR Bicarbonate OR Sodium Or Chloride OR betaine OR taurine OR alanine OR glycine OR Ion\* OR Osmolyte\* OR Electrolyte\* OR "volume regulation" OR "cell volume") AND (extracell\* OR blood OR hemolymph\* OR haemolymph\* OR "coelomic fluid" OR intracell\* OR cell\* OR tissue OR whole-body OR muscle OR gill OR mantle OR heart OR nerv\*)

1. Google Scholar

Date of search: 24.04.2018

Search String:

(~osmoconformer OR "volume regulation"OR "cell volume")AND(~salinity OR osmolality OR osmotic) AND ("amino acid" OR Methylamine\* OR ~Ion\* OR ~Osmolyte\*) AND (~invertebrate OR macrofauna -fish)AND(~marine OR brackish OR estuary\* OR ~benthic OR ~freshwater)

Further settings:

• Without Citations and Patents

• From 1945 – 2018

1. **Scopus**

Date of search 30.01.2019

Search String:

( marine OR brackish OR estuar\* OR coastal OR sea OR lagoon\* OR benth\* OR demersal OR shore\* OR intertidal OR subtidal OR ocean\* OR bay\* OR cove\* OR harbo\* OR lake\* OR pond\* OR bog\* OR stream\* OR river\* OR freshwater\* OR creek\* OR lotic OR lentic OR headwater\* OR reservoir\* OR brook\* OR wetland\* OR \*pool\* OR marsh\* OR watershed\* OR catchment\* OR limnol\* OR glacial\* OR "inland waters" )

AND ( "Free amino acid" OR "amino acid" OR methylamin\* OR "methylated ammonium" OR ion\* OR osmolyte\* OR electrolyte\* OR "volume regulation" OR "cell volume" )

AND ( salin\* OR "salt stress" OR osmolality OR osmotic OR osmolarity OR isoosmo\* OR hypoosmo\* OR osmoregulat\* OR osmoconform\* )

AND ( invertebrate OR macrofauna OR sponge OR porifera OR anthozo\* OR anemone OR coral OR cnidaria\* OR mollus\* OR bivalv\* OR gastropod\* OR clam OR mussel OR snail OR slug OR polyplacophora OR cephalopod\* OR polychaete OR worm OR annelid\* OR chaetognat\*or AND entrproct\* OR gastrotrich\* OR hairyback OR hemichordat\* OR kinorynch\* OR "mud dragon" OR arthropod\* OR nematod\* OR nematomorph\* OR nemert\* OR phoronid\* OR plathelminth\* OR flatworm OR priapulid\* OR sipuncul\* OR xenacoelomorph\* OR brachiopod\* OR lampshells OR bryozo\* OR "moss animal" OR "sea mat" OR ectoproct OR chordat\* OR tunicat\* OR urochordat\* OR caphalochordat\* OR lancelet\* OR echinoderm\* OR "sea star" OR "sea urchin" OR "sea cucumber" OR "feather star" OR crinoid\* OR comatulid\* OR "sand dollar" OR "sea lil\*" OR "brittle star" OR crustac\* AND NOT plankton AND NOT copepod AND NOT human\* AND NOT diatom AND NOT teleost AND NOT mammal\* AND NOT amphib\* AND NOT reptile AND NOT vertebrat\* AND NOT insect\* AND NOT algae AND NOT bacteria AND NOT archea AND NOT fish AND NOT plant AND NOT foraminifer\* ) AND ( LIMIT-TO ( SUBJAREA , "AGRI" ) OR LIMIT-TO ( SUBJAREA , "ENVI" ) OR LIMIT-TO ( SUBJAREA , "BIOC" ) OR LIMIT-TO ( SUBJAREA , "MEDI" ) )

Further Settings:

* Search limited to biological research fields: Agricultural and Biological Sciences, Biochemistry, Genetics and Molecular Biology, Environmental Science, Medicine

• All years (oldest 1960)

• advanced search mode used