

README: Experimental restoration of the Charophytes *C. aspera* and *C. tomentosa* in a shallow Baltic Sea bay. Doi XXXX

C.L. Faithfull, E. Tamarit, P. Nordling, E. Kraft. Restoring charophytes is still a challenge: a call for developing successful methods. *Aquatic Botany* 2024.
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This data comprises three different experiments in three different areas to test methods for (A) replanting *C. aspera*, (B) the effects of harvesting *C. aspera* on the donor *C. aspera* meadow and (C) replanting *C. tomentosa*.

The experiment took place over two growing seasons and light, temperature and sediment water and organic matter content data is also available for the experimental areas. Three methods of planting were tested for *C. aspera*, spade planting, jute band, BESE elements© and natural recolonization and two methods for *C. tomentosa*, BESE elements and natural recolonization. Additionally, four levels of harvesting were tested in the *C. aspera* meadow, removal of 0, 0.8%, 1.8% or 2.6 % of the *C. aspera* Shoot height, shoot density and coverage of aquatic vegetation species in the plots was measured on 1 June (before treatment), 1 July, 24 August and 29 September 2021 by snorkelling. Follow up measurements of vegetation coverage were made 15 months after initial planting on 14 September 2022 for all the plots.

All data used in the experiment are in tab separated files. Data for experiment A is available in the “*C. aspera* planting” file (19 columns, 60 rows including header), experiment B is the “*C.aspera* donor” file (18 columns, 81 rows including header) and experiment C is the *C.tomentosa* planting file (20 columns and 46 rows including header). The details regarding experimental setup, treatments and measurements are available in the published article. Data on sediment water and organic content from three sites, the donor area, dredged area and deposited sediment area are available in the “Sediment” file (6 columns and 20 rows including header). The data from the HOBO loggers, which continuously monitored light and temperature at two sites in the *C. aspera* planting experiment and in the *C. aspera* donor experiment are available in the “TempHOBO” file (6 columns and 2985 rows including header) and “LuxHOBO” file (6 columns and 2985 rows including header). Please note that the loggers were started before they were deployed on 28 May 2021, so the temperature and Lux values should not be used on this day. Nearby the *C. tomentosa* experimental site we set up two loggers for temperature and photosynthetically active radiation and different depths. This data is located in the PAR1 file (4 columns and 4369 rows including header) and PAR2 file (4 columns and 4585 rows including header). Where data is missing it is labelled NA in the files, this is primarily during the follow up measurements in 2022 for *C.aspera* planting, *C.tomentosa* planting and *C.aspera* donor as we excluded measurements of coverage of filamentous algae, and shoot height and density on this sampling occasion due to time constraints. The Metadata for each file is included in the table 1.

Table 1. Metadata from the experiment. Column names and the explanation of what was measured in each column is listed.

Column title	Explanation
LuxHOBO	Data from HOBO light meters
Index	Index number
DateTime	Date (Year-month-day) and Time (Hour:minute:second) UTC +1
lux1	Light in lux <i>C. aspera</i> plantering site, 0.45 m djup
lux 2	Light in lux <i>C. aspera</i> plantering site, 0.45 m djup
lux3	Light in lux <i>C. aspera</i> donor site, 0.55 m djup
lux4	Light in lux <i>C. aspera</i> donor site, 0.55 m djup

TempHOBO

Index
 DateTime
 Temp1
 Temp3
 Temp4
 Temp2

Data from HOBO temperature meters

Index number
 Date (Year-month-day) and Time (Hour:minute:second)
 Light in lux C. aspera plantering site, 0.45 m djup
 Light in lux C. aspera plantering site, 0.45 m djup
 Light in lux C. aspera donor site, 0.55 m djup
 Light in lux C. aspera donor site, 0.55 m djup

PAR1

Temp
 PAR1
 Date
 Time

Data from Photosynthetic active radiation meter located at experiment C (C. tomentosa planting experiment) 0.2 m below water surface

Temperature (degrees Celcius)
 Photosynthetically active ration measurement
 Date the measurement was taken (Year-month-day)
 Time the measurement was taken (Hour:minute:second)

PAR2

Temp
 PAR2
 Date
 Time

Data from Photosynthetic active radiation meter located at experiment C (C. tomentosa planting experiment) 1 m below water surface

Temperature (degrees Celcius)
 Photosynthetically active ration measurement
 Date the measurement was taken (Year-month-day)
 Time the measurement was taken (Hour:minute:second)

Sediment

Treatment
 Donor
 Dredged
 Deposited
 Date
 AFDM
 SOLIDS
 Percent_water
 Percent_organic

Data from sediment cores

Donor, Dredged or Deposited, see below.
 Location of the sediment core, in the donor area of the C. aspera meadow where the donor experiment took place (B)
 Location of the sediment core, in the dredged area located beside the deposited area.
 Location of the sediment core, in the deposited area, where the C. aspera planting experiment took place (C)
 Date the core was taken (Year-month-day)
 Ash free dry mass (g)
 Sediment weight without water (g)
 Sediment percent water
 Percent organic matter in sediment

C.aspera planting

Date
 Day
 Plotname
 Treatment
 bese
 spade
 control
 jute
 Coverage filamentous algae

Data from the C. aspera planting experiment

Date the measurement was taken (Year-month-day)
 Day the measurement was taken from the start of the experiment
 Name of the plot in the field
 bese, spade, control or jute. See below for explanations
 Bese elements
 Relocation and planting using a only a spade and underwater transport
 No planting
 Planting by anchoring shoots of C. aspera with a jute band.
 In percent

Snails	Number of snails in the entire plot
Bare	Percentage of bare area in the plot
Shoot height	mm of <i>C. aspera</i>
Shoot density	Per 10cm ² of <i>C. aspera</i>
<i>C. aspera</i>	Coverage of the species in percent
<i>Lemna triscula</i>	Coverage of the species in percent
<i>Stuckenia pectinata</i>	Coverage of the species in percent
<i>Myriophyllum</i> spp.	Coverage of the species in percent
<i>Fucus radicans</i>	Coverage of the species in percent
<i>Ruppia</i> sp. <i>Z. palustris</i>	Coverage of the species in percent
<i>Najas marina</i>	Coverage of the species in percent
<i>Callitriche hermaphroditica</i>	Coverage of the species in percent
<i>C. tomentosa</i>	Coverage of the species in percent
Biomass	Total biomass of <i>C. aspera</i> as calculated by shoot height x shoot density x coverage percent

C.aspera donor

Date	Date the measurement was taken (Year-month-day) Day the measurement was taken from the start of the experiment
Day	
Plotname	Name of the plot in the field
Treatment	Removal treatments, see below for explanations
Control	No removal of <i>C. aspera</i>
Remove0.8	Removal of 0.8% of the <i>C. aspera</i> coverage
Remove1.8	Removal of 1.8% of the <i>C. aspera</i> coverage
Remove2.6	Removal of 2.6% of the <i>C. aspera</i> coverage
Coverage filamentous algae	In percent
Snails	Number of snails in the entire plot
Bare	Percentage of bare area in the plot
Shoot.density	mm of <i>C. aspera</i>
Shoot.height	Per 10cm ² of <i>C. aspera</i>
<i>C. aspera</i>	Coverage of the species in percent
<i>Lemna triscula</i>	Coverage of the species in percent
<i>Stuckenia pectinata</i>	Coverage of the species in percent
<i>Potamogeton perfoliatus</i>	Coverage of the species in percent
<i>Myriophyllum</i> spp.	Coverage of the species in percent
<i>Ruppia</i> sp. <i>Z. palustris</i>	Coverage of the species in percent
<i>Najas marina</i>	Coverage of the species in percent
<i>Rivularia</i>	Coverage of the species in percent
Sulfur bacteria	Coverage of the species in percent

Data from the C. aspera donor experiment

C.tomentosa planting

Date	Date the measurement was taken (Year-month-day) Day the measurement was taken from the start of the experiment
Day	
Plotname	Name of the plot in the field
Treatment	Treatments, see below for explanations
Control	No planting

Data from the C. tomentosa experiment

Tom	Planting of <i>C. tomentosa</i>
Coverage filamentous algae	In percent
Snails	Number of snails in the entire plot
Bare	Percentage of bare area in the plot
Shoot.height	mm of <i>C. tomentosa</i>
Shoots	Per 10cm ² of <i>C. tomentosa</i>
<i>C. aspera</i>	Coverage of the species in percent
<i>Lemna triscula</i>	Coverage of the species in percent
<i>Myriophyllum</i> spp.	Coverage of the species in percent
<i>Ruppia</i> sp. <i>Z. palustris</i>	Coverage of the species in percent
<i>Rivularia</i>	Coverage of the species in percent
<i>Stuckenia pectinata</i>	Coverage of the species in percent
<i>Potamogeton perfoliatus</i>	Coverage of the species in percent
<i>Ranunculus circinatus</i>	Coverage of the species in percent
<i>C. tomentosa</i>	Coverage of the species in percent
<i>Najas marina</i>	Coverage of the species in percent
<i>Callitriche hermaphroditica</i>	Coverage of the species in percent