Additional figures – Data from the laboratory tank experiment using specimens collected in the Baltic Sea
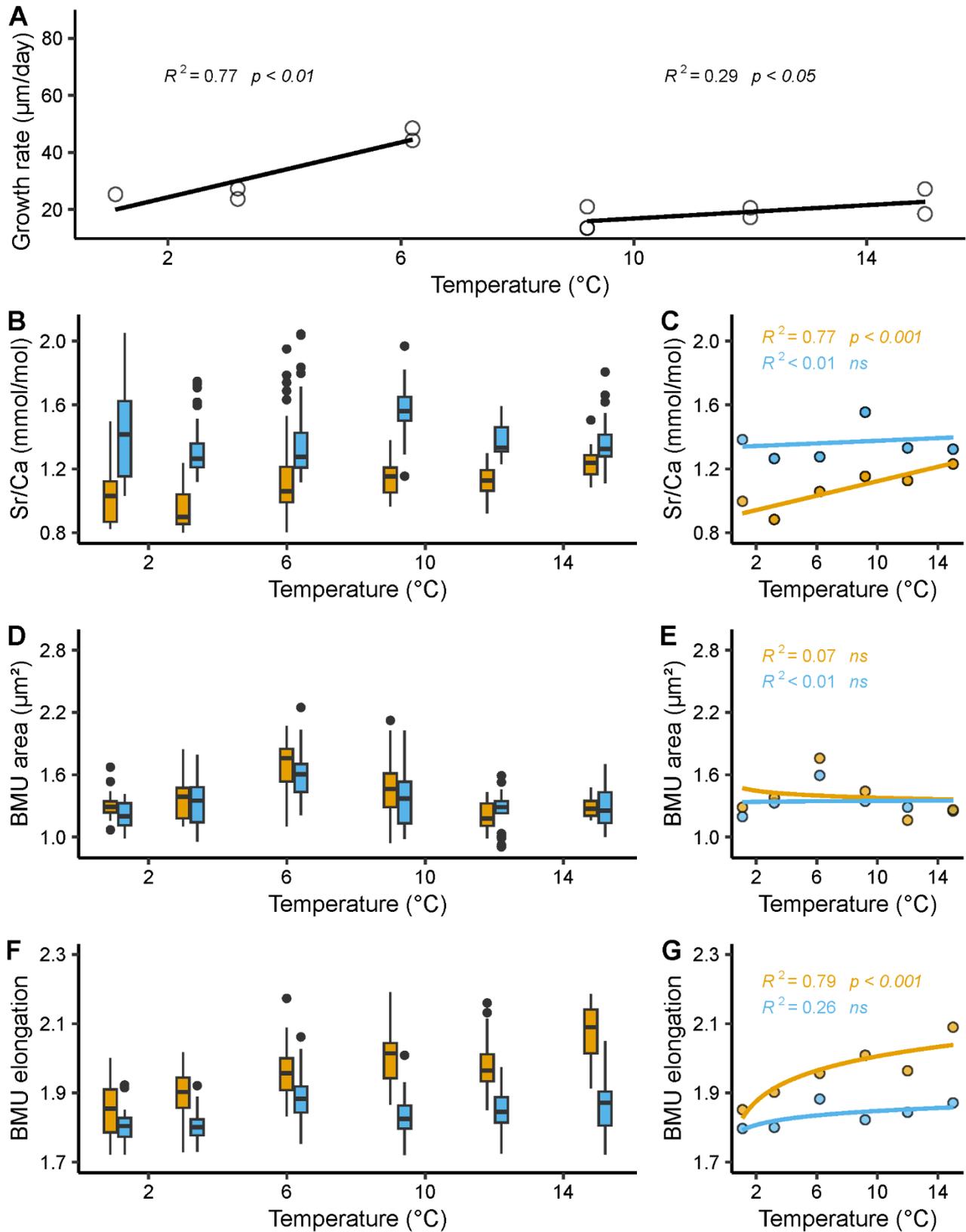
Figure A2. Shell growth rate (μm/day), molar Sr/Ca ratios (mmol/mol) and ultrastructural properties, i.e., biomineral unit (BMU) area (μm²) and elongation, from the outer portion of the outer shell layer

(oOSL, blue) and the inner portion of the outer shell layer (iOSL, orange) of *Arctica islandica* specimens collected in the Baltic Sea cultured at 1.1, 3.2, 6.2, 9.2, 12 and 15°C. (**A**) Shell growth rate of studied specimens. Black solid line: linear model. (**B**) Shell Sr/Ca values and corresponding (**C**) median values weighted for the number of specimens (linear regression). (**D**) Area of the BMUs and corresponding (**E**) median values weighted for the number of specimens (natural logarithm regression). (**F**) Elongation of the BMUs and corresponding (**G**) median values weighted for the number of specimens (natural logarithm regression). In B, D and F, the bold black line represents the median, lower and upper limits of the boxes stand for the first and third quartiles, vertical lines denote the minimum and maximum values, and black dots equal outliers. For all regressions, ns = non-significant at $p > 0.05$.
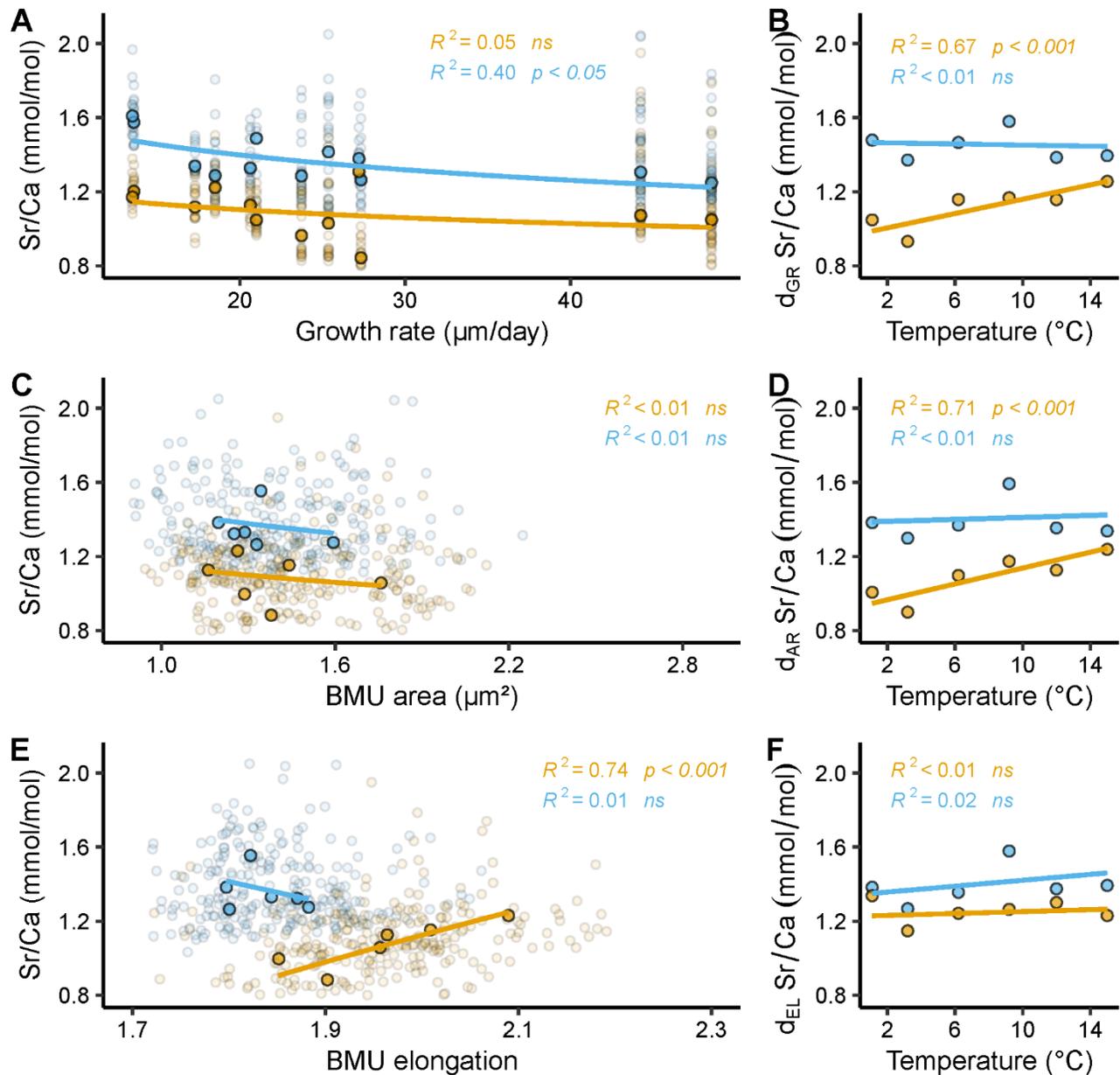
Figure A3. Relationships between shell Sr/Ca ratios (mmol/mol) and growth rate (μm/day), ultrastructural properties, i.e., biomineral unit (BMU) area (μm²) and elongation, and temperature (°C). Blue and orange denote data from the outer and inner portion of the outer shell layer (oOSL, iOSL), respectively, of *Arctica islandica* specimens collected in the Baltic Sea cultured at 1.1, 3.2, 6.2, 9.2, 12 and 15°C. (**A**) Relationship between shell Sr/Ca and growth rate (GR). (**B**) Relationship between detrended (d) Sr/Ca and temperature (T), after removal of GR-related effects. (**C**) Relationship between Sr/Ca and BMU area (AR). (**D**) AR-detrended Sr/Ca vs T. (**E**) Relationship between Sr/Ca and BMU elongation (EL). (**F**) EL-detrended Sr/Ca vs T. In A, C and E, opaque circles = median weighted for the number of specimens, translucent circles = raw data from which medians were calculated. All regression models were fitted to the median Sr/Ca values of a given temperature regime, weighted for the number of specimens, with a natural logarithm function for GR, AR and EL, and a linear function for T. For all regressions, ns = non-significant at $p > 0.05$.
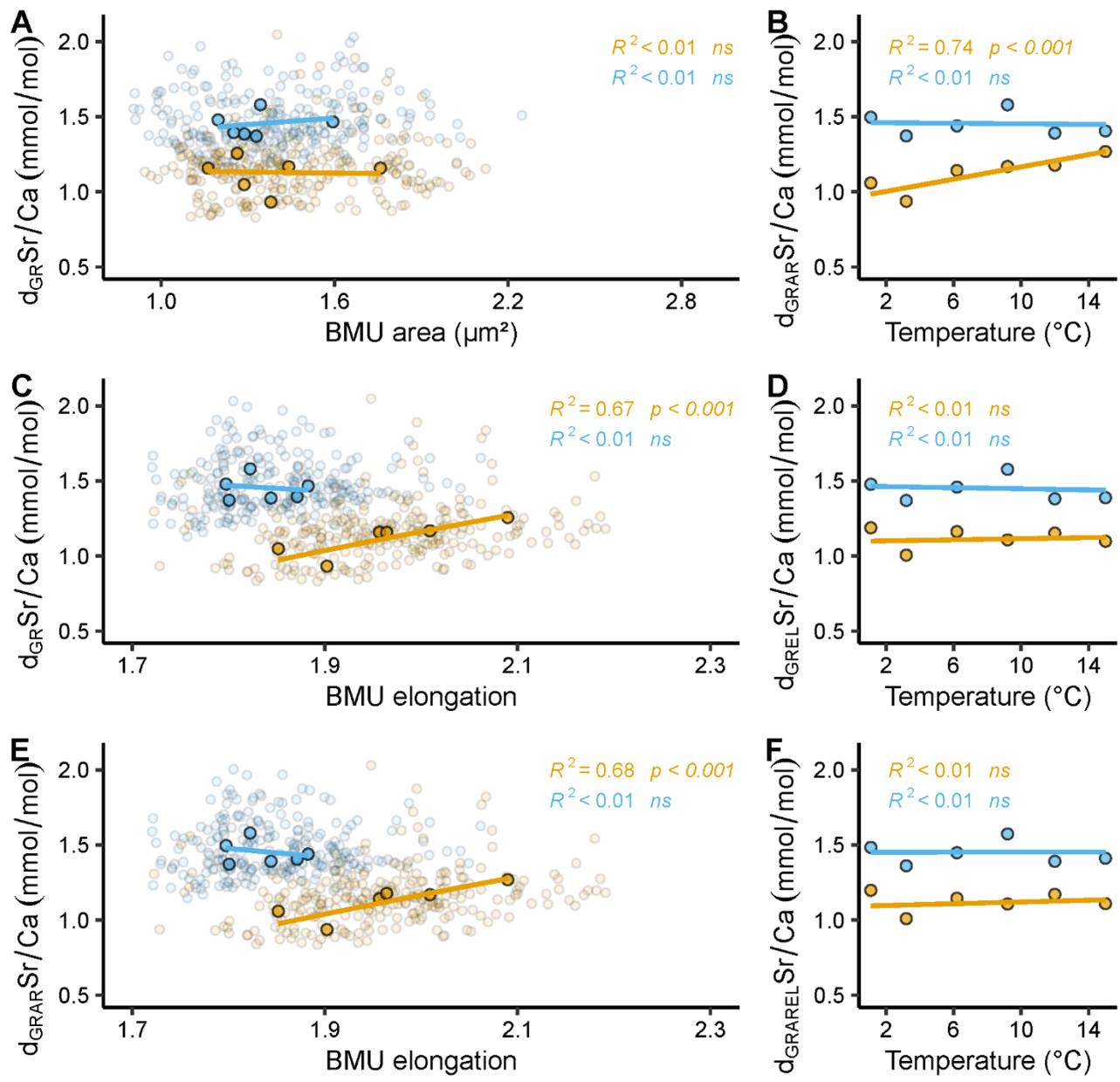
Figure A4. Relationships between shell Sr/Ca ratios (mmol/mol), ultrastructural properties, i.e., biomineral unit (BMU) area (μm^2) and elongation, and temperature (°C). Blue and orange denote data from the outer and inner portion of the outer shell layer (oOSL, iOSL), respectively, of *Arctica islandica* specimens collected in the Baltic Sea cultured at 1.1, 3.2, 6.2, 9.2, 12 and 15°C. (**A**) Relationship between growth rate (GR)-detrended (d) shell Sr/Ca data and BMU area (AR). (**B**) Relationship between detrended AR-detrended Sr/Ca data and temperature (T). (**C**) Relationship between GR-detrended shell Sr/Ca data and BMU elongation (EL). (**D**) GR and EL-detrended Sr/Ca data vs T. (**E**) Relationship between GR and AR-detrended shell Sr/Ca data and EL. (**F**) GRAREL-detrended Sr/Ca data vs T. In A, C and E, opaque circles = median weighted for the number of specimens; translucent circles = raw data from which medians were calculated. All regression models were fitted to the median Sr/Ca values of a given temperature regime, weighted for the number of

specimens, with a natural logarithm function for GR, AR and EL, and a linear function for T. For all regressions, ns = non-significant at $p > 0.05$.
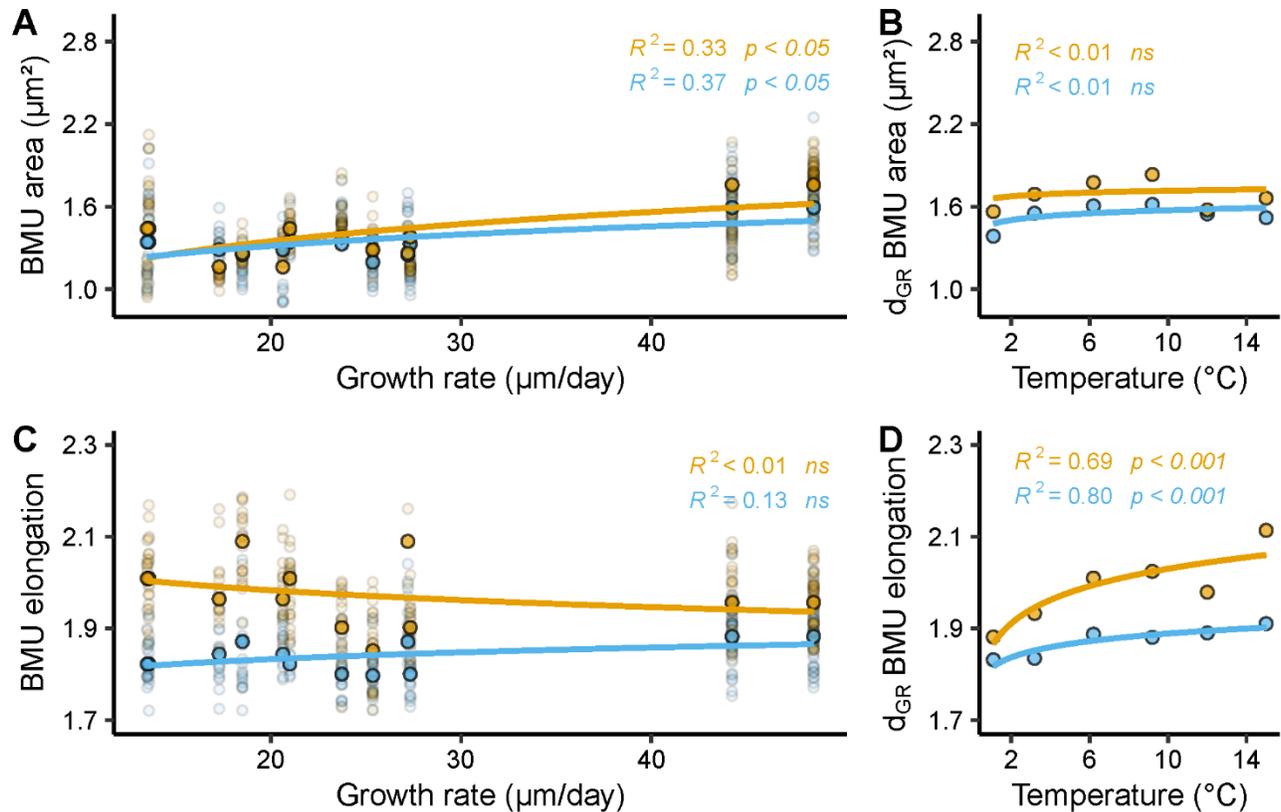
Figure A5. Relationships between shell ultrastructural properties, i.e., biomineral unit (BMU) area (µm²) and elongation, growth rate (µm/day), and temperature (°C). Blue and orange denote data from the outer and inner portion of the outer shell layer (oOSL, iOSL), respectively, of *Arctica islandica* specimens collected in the Baltic Sea cultured at 1.1, 3.2, 6.2, 9.2, 12 and 15°C. (**A**) Relationship between BMU area and shell growth rate (GR). (**B**) Relationship between GR-detrended BMU area (AR) and temperature (T). (**C**) Relationship between BMU elongation (EL) and GR. (**D**) GR-detrended EL vs T. Opaque circles = median weighted for the number of specimens; translucent circles = raw data from which medians were calculated. All regression models were fitted to the median BMU area and elongation values of a given temperature regime, weighted for the number of specimens, with a natural logarithm function for GR and T. For all regressions, ns = non-significant at $p > 0.05$.