Supplementary material

Climatology of sea surface temperature (SST)

Sea surface temperature was obtained from 1 km^2 resolution weekly composites generated using National Oceanic and Atmospheric Administration (NOAA) and European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) Advanced Very High Resolution Radiometer (AVHRR) satellite images available from the Maurice Lamontagne Institute sea surface temperature processing facility. The system is detailed in Galbraith and Larouche (2011) and compared to the Pathfinder 5.2 dataset (Casey et al., 2010) in the Gulf of St. Lawrence in Galbraith et al. (2012). The SST composites were previously validated over the GSL by comparisons to in-situ thermograph measurements (Pettigrew et al., 2011). Weekly climatology of the spatially averaged temperature were created for each area delineated in Figure 1B over the period 1985-2010, and the interannual standard deviation computed.

Casey, K.S., Brandon, T., Cornillon, P., Evans, R., 2010. Oceanography from Space: revisited. In: Barale, V., Gower, J.F.R., Alberotanza., L. (Eds.), The Past, Present and Future of the AVHRR Pathfinder SST Program. Springer.

Galbraith, P.S., Larouche, P. 2011. Sea-surface temperature in Hudson Bay and Hudson Strait in relation to air temperature and ice cover breakup, 1985-2009. J. Mar. Systems, 87, 66-78.

Galbraith, P.S., Larouche, P., Chassé, J. Petrie, B. 2012. Sea-surface temperature in relation to air temperature in the Gulf of St. Lawrence: interdecadal variability and long term trends. Deep Sea Res. II, V77-80, 10-20.

Pettigrew, B., Larouche, P., Gilbert, D. 2011. Validation régionale des images composites des températures de surface de l'estuaire et du Golfe du Saint-Laurent. Rapp. Tech. Can. Hydrogr. Sci. Ocean. 270,viii+31 pp.

Table S1. For each population, the individual and mean ± 1 SD cephalothorax length (mm) of the selected females used to obtain larvae for the incubation experiments.

Female number	Population			
	LE12	LE14	GSL12	NWA14
1	25.1	22.5	24.2	27.0
2	22.3	25.0	24.2	22.5
3	25.3	25.0	22.8	26.0
4	22.5	25.2	20.2	25.5
5	23.7	25.1	20.2	23.5
6	23.3	26.4	25.5	26.5
7	27.5	26.7	24.7	23.5
8		25.8		21.0
9				26.2
10				22.5
Mean ± 1 SD	24.24 ± 1.85	25.21 ± 1.28	23.11 ± 2.15	24.53 ± 2.07

Table S2. For each population, the relative weights applied to the observed survival data to reflect the influence of the number of estimates (jars) available and the relative survival success at each incubation temperature, and the Akaike's information criterion (AIC) for the SN distribution fitted to the data with and without weight.

Population	Incubation temperature (°C)						AIC	
	0	3	6	9	12	15	weights	no weight
NWA14	1	1	1	3	0	0	-14.515	-10.772
GSL12	1	2	3	5	1	0	-23.779	8.365
LE12	0	3	3	3	3	1	1.075	11.134
LE14	1	2	2	3	3	2	-66.717	-28.891

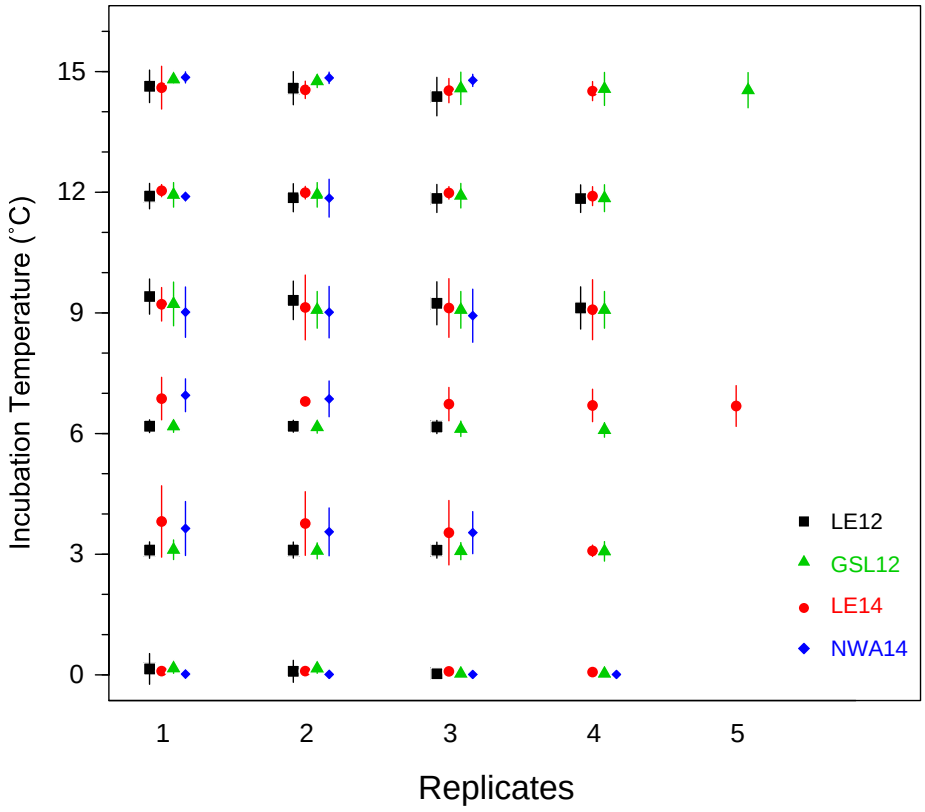


Figure S1. Mean temperature and standard deviation during incubation for groups (jars) of 25 northern shrimp larvae monitored for the 2012 and 2014 experiments.

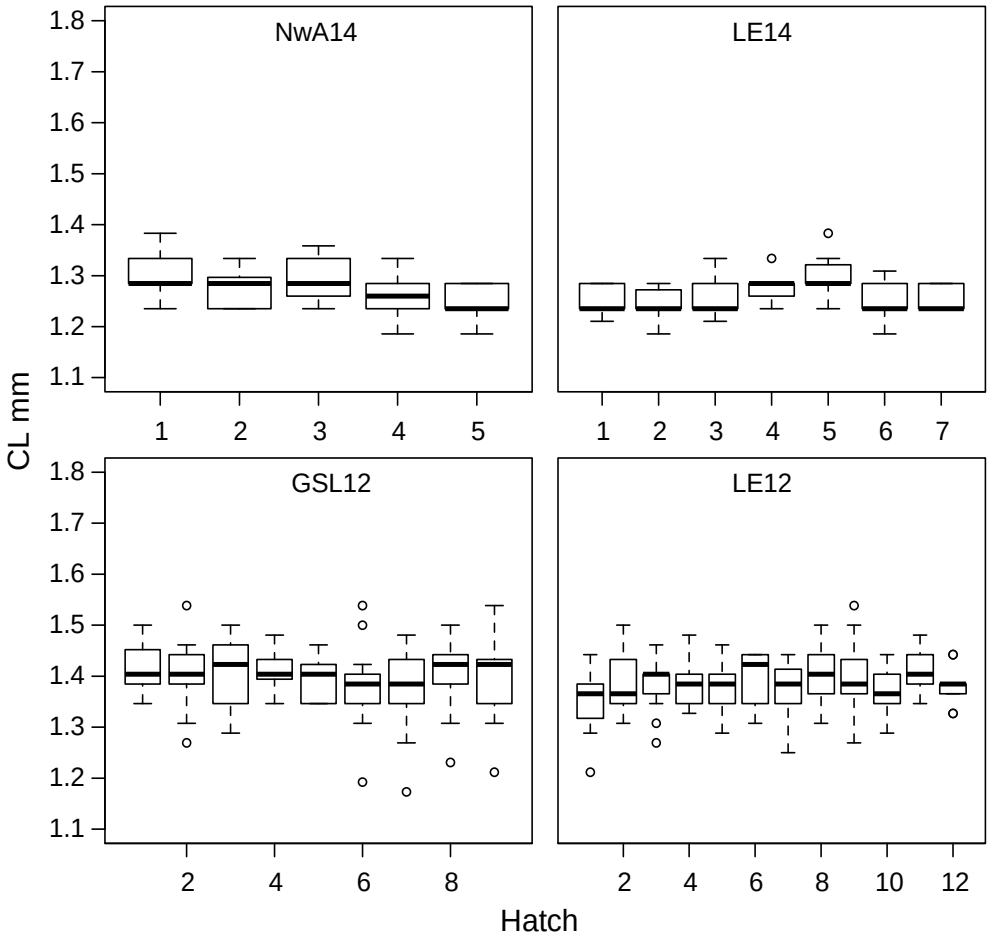


Figure S2. Mean stage I northern shrimp larvae cephalothorax length (CL) at each hatch event for each population in spring 2012 and 2014.

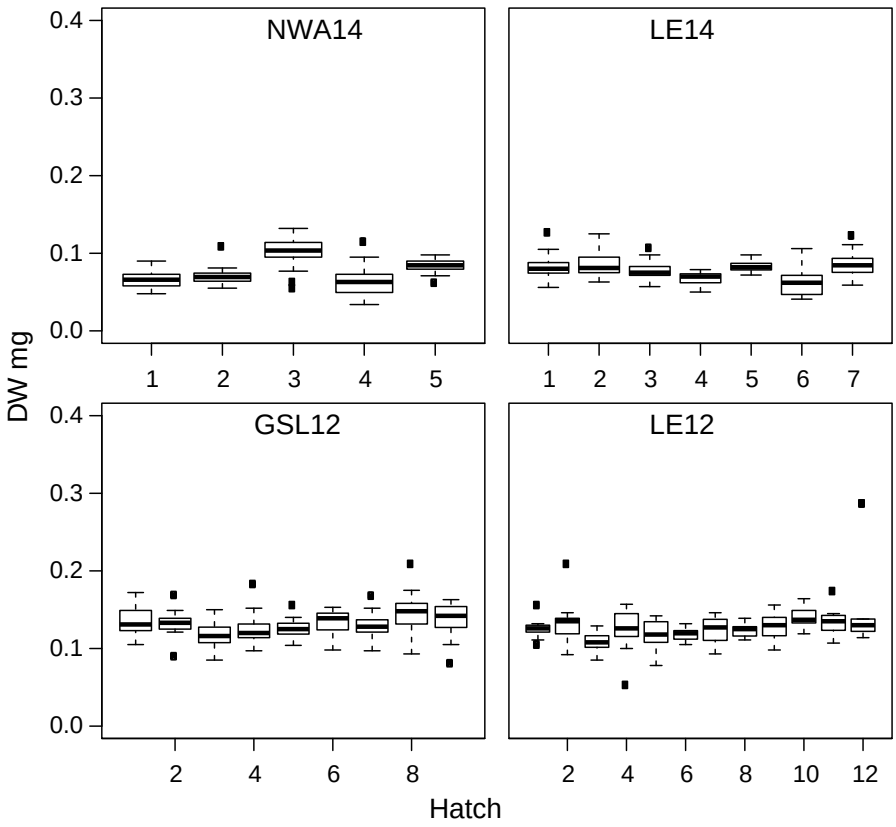


Figure S3. Mean stage I northern shrimp larvae dry weight (DW) at each hatch event for each population in spring 2012 and 2014.

Table S3. ANOVA tables of linear model applied for the effects of temperatures, years, and source populations on number of days to the first and second molt.

Sources	SS Type I	*df*	F	*p*
Time to first molt				
Temperature	754.45	4	284.55	<< 0.001
Year	0.57	1	0.85	0.360
Population	2.63	2	1.98	0.149
Temperature*Year	1.74	4	0.65	0.568
Temperature*Population	3.57	8	0.67	0.540
Residuals	31.82	48		
Time to second molt				
Temperature	429.05	3	45.16	<< 0.001
Year	3.64	1	1.15	0.294
Population	6.86	2	1.08	0.354
Temperature*Year	44.45	3	4.67	0.010
Temperature*Population	26.21	4	2.07	0.116
Residuals	76.00	24		

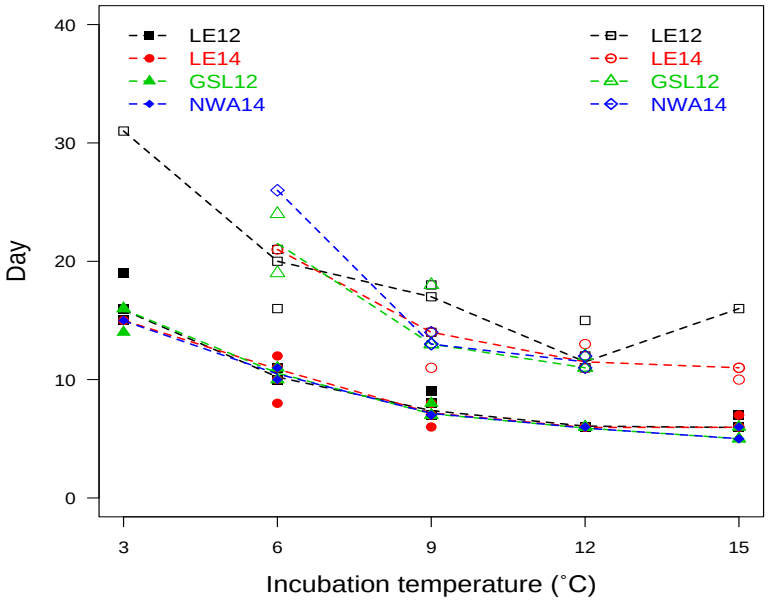


Figure S4. Relationships between incubation temperatures and the minimum number of days to the first moult (solid symbols) and the second moult (open symbols) in 2012 and 2014.

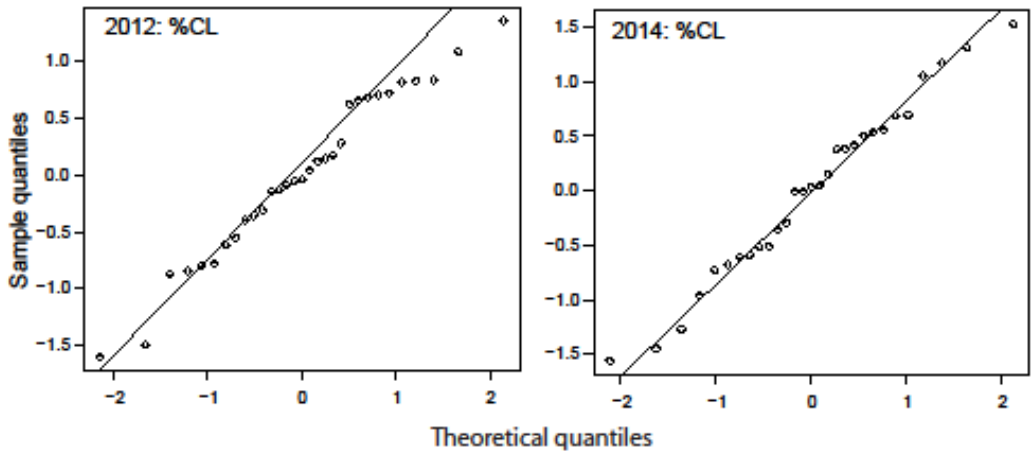
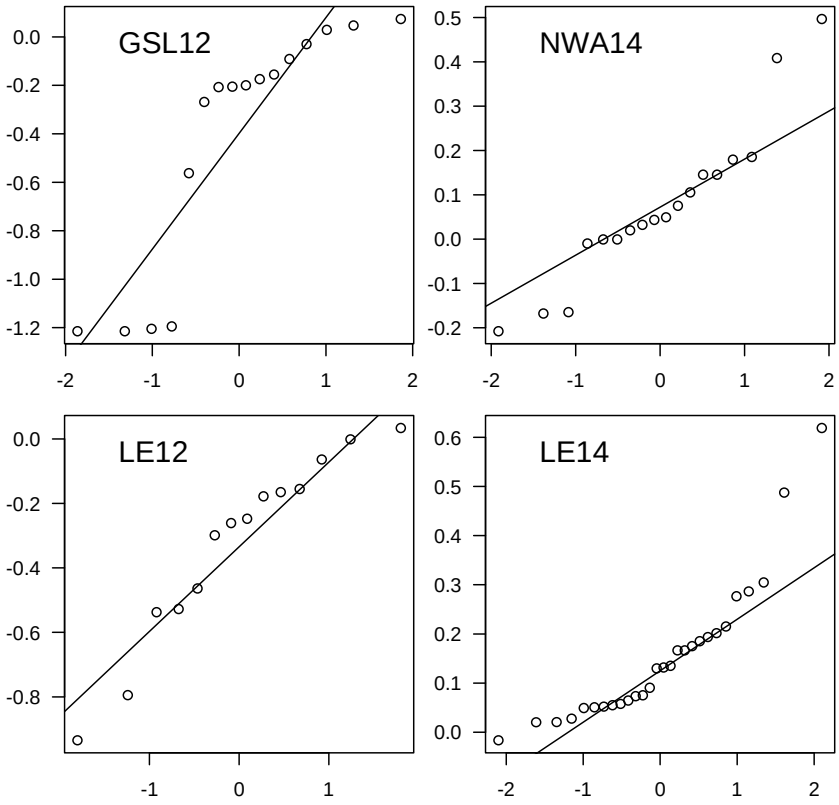


Figure S5. QQplots of the residuals from the LMM models on the effects of population and incubation temperature on larval cephalothorax length increment (%CL) at the first moult.



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69 Figure S6. QQplots of the residuals from the best-fit skew-normal curve for survival for each

70 larval population.

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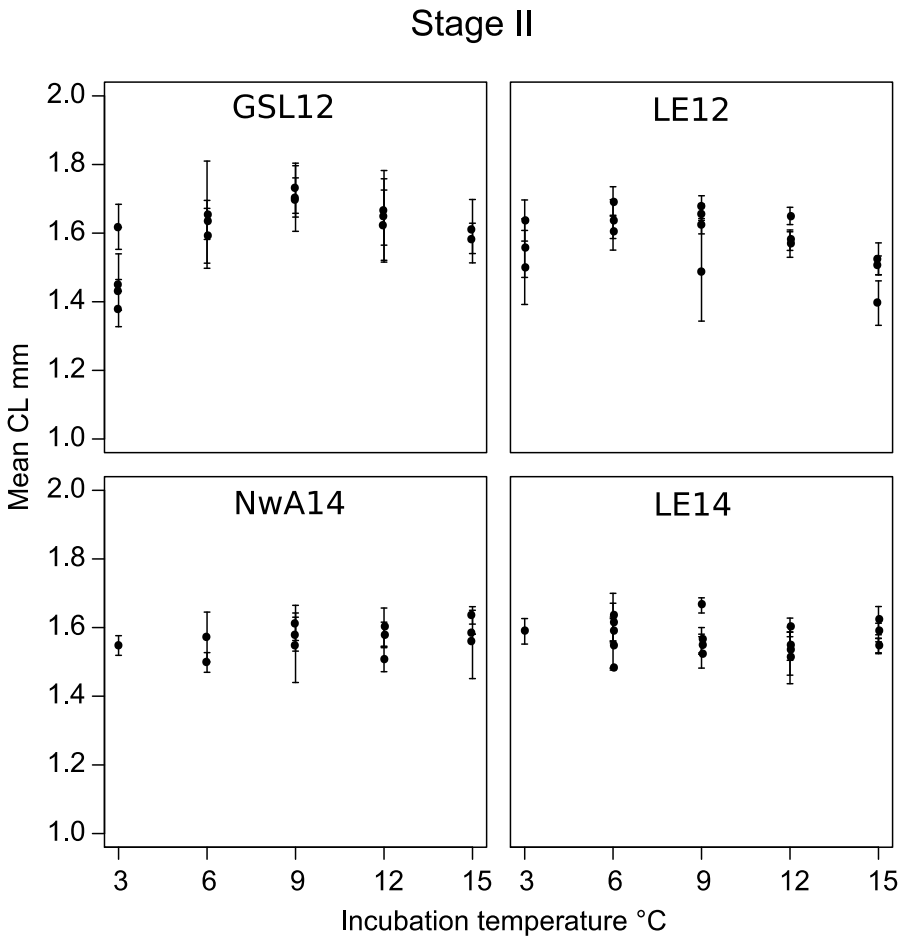

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77 Figure S7. Mean ± SD cephalothorax length (CL) and standard deviation of stage II larvae for
78 each incubation (replicates) and population in 2012 and 2014

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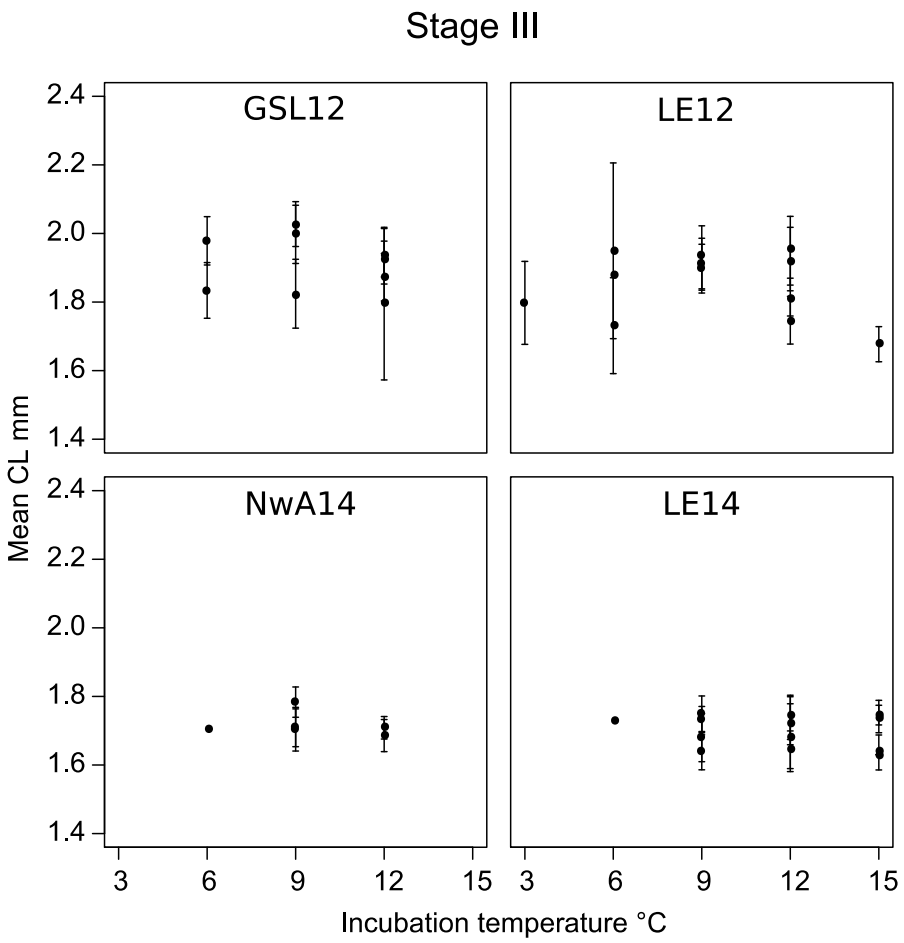

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82 Figure S8. Mean ± SD cephalothorax length (CL) and standard deviation of stage III larvae for
83 each incubation (replicates) and population in 2012 and 2014.