Appendix 3: Outlier effect on population growth by source population.

From Copeia manuscript “Warming Strengthens the Ecological Role of Intraspecific Variation in a Predator”

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In predicting fish population growth by fish source population and warming treatments, there were a few clear outliers – mesocosm numbers 6 (replicate of unwarmed temperature, warm-source population) and 10 (replicate of warmed temperature, cool-source population) (Fig. S1). These outliers were removed to understand trends in their absence, and to conform to assumptions of ANOVA. Log10 transformation of fish population growth helped reduce the problem, but still led to mesocosm 6 being a strong outlier. These high value outliers could have occurred via birth 1) early in the experiment, where resource availability was high and cannibalism rates were thus low, or 2) late in the experiment if a female gave birth to a brood immediately before fish were collected and euthanized at the end of the experiment, before they could be cannibalized. Offspring sizes in these mesocosms suggest the former. In most cases, fish source population significant predicted population growth (Tables S1-4).



Fig S1. Actual versus predicted plot from a 2x2 ANOVA of warming and source population predicting the number of immature fish (“nimmature,” i.e. number of offspring). Two large outliers are seen towards the top of the graph. The top left outlier is mesocosm #6 and the top right is mesocosm #10.

Table S1. Summary of ANOVA without removing outliers.

| **Source** | **Nparm** | **DF** | **Sum of Squares** | **F Ratio** | **Prob > F** |  |
| --- | --- | --- | --- | --- | --- | --- |
| temptreat |  1 | 1 | 176.04167 | 1.5302 | 0.2304 |  |
| fishtreat |  1 | 1 | 222.04167 | 1.9301 | 0.1800 |  |
| temptreat\*fishtreat |  1 | 1 | 187.04167 | 1.6259 | 0.2169 |  |

Table S2. Summary of ANOVA with removal of mesocosm #6.

| **Source** | **Nparm** | **DF** | **Sum of Squares** | **F Ratio** | **Prob > F** |  |
| --- | --- | --- | --- | --- | --- | --- |
| temptreat |  1 | 1 | 416.10159 | 6.9644 | 0.0162\* |  |
| fishtreat |  1 | 1 | 483.65714 | 8.0950 | 0.0104\* |  |
| temptreat\*fishtreat |  1 | 1 | 34.76825 | 0.5819 | 0.4549 |  |

Table S3. Summary of ANOVA with removal of both outliers.

| **Source** | **Nparm** | **DF** | **Sum of Squares** | **F Ratio** | **Prob > F** |  |
| --- | --- | --- | --- | --- | --- | --- |
| temptreat |  1 | 1 | 207.42424 | 8.0628 | 0.0109\* |  |
| fishtreat |  1 | 1 | 254.69697 | 9.9004 | 0.0056\* |  |
| temptreat\*fishtreat |  1 | 1 | 0.05455 | 0.0021 | 0.9638 |  |

Table S4. Summary of ANOVA predicting log10 transformed population growth, without outliers removed.

| **Source** | **Nparm** | **DF** | **Sum of Squares** | **F Ratio** | **Prob > F** |  |
| --- | --- | --- | --- | --- | --- | --- |
| temptreat |  1 | 1 | 0.25453302 | 1.8864 | 0.1865 |  |
| fishtreat |  1 | 1 | 0.79965253 | 5.9265 | 0.0256\* |  |
| temptreat\*fishtreat |  1 | 1 | 0.00373805 | 0.0277 | 0.8697 |  |