**Appendix S1**

**Supporting information for:**

Pintar M.R., & Resetarits, Jr., W.J. Refilling temporary ponds has timing-dependent effects on *Hyla gratiosa* performance. *Freshwater Biology*.

These are the results for the surviving larvae remaining in mesocosms at the end of our experiment on 4–7 November 2014. *Hyla gratiosa* larvae are incapable of overwintering, so these size and developmental measures have relatively little value in a larger ecological context given that none of these larvae would survival the ensuing winter. See the main text for additional information.

**Methods**

Of the remaining larvae, we haphazardly sampled 16 individuals from each mesocosm. These 16 larvae were individual weighed and photographed, while we measured their total length from photographs in ImageJ (Schneider, Rasband & Eliceiri, 2012). We also determined the Gosner stage of the 16 sampled larvae (Gosner, 1960). The remaining individuals that we did not individual process were counted and cumulatively wet massed.

All larval size analyses included block as a random factor, as we tested for significance with approximate *F* tests (Type III Satterthwaite) in the lmerTest package v 2.0-36 (Kuznetsova, Brockhoff & Christensen, 2017) in R v 3.4.3 (R Core Team, 2017). Gosner stage and survival were square root transformed (), and other measures of body size were log transformed. We analyzed Gosner stage of larvae using a mixed effect model with treatment as a fixed factor and overall survival as a fixed covariate. Larval mass and total length were analyzed independently with mixed effects models using overall survival and stage as covariates and treatment as a fixed factor. Larval body condition (size independent mass) was analyzed by mean-scaling mass to decouple variance from the measurement scale and means, regressing against total length, and using the residuals in a mixed effects model with overall survival and stage as covariates and treatment as a fixed factor (Berner, 2011).

**Results**

Developmental (Gosner) stage of the larvae at the end of the experiment was not affected by treatment and did not covary with survival (Table S1, Fig. S1e). Larval mass and body condition both covaried with both stage and overall survival, and were affected by treatment (Table S1). Larval mass and body condition were higher when overall survival was lower, among larvae at later developmental stages, and as mesocosms spent more time at low water levels (Fig. S1b,c). In Full mesocosms average mass was 1.20 g, 13 percent higher than the lowest average mass of 1.06 g in Low mesocosms. There were no effects in the larval total length analysis (Table S1; Fig. S1d). Excluding overall survival as a covariate did not affect the significance of any larval analyses, so we maintained it as a covariate.

**References**

Berner D. (2011) Size correction in biology: how reliable are approaches based on (common) principal component analysis? *Oecologia* **166**, 961–971.

Gosner K.L. (1960) A simplified table for staging anuran embryos and larvae with notes on identification. *Herpetologica* **16**, 183–190.

Kuznetsova A., Brockhoff P.B. & Christensen R.H.B. (2017) lmerTest package: tests in linear mixed effects models. *Journal of Statistical Software* **82**.

R Core Team (2017) R: A Language and Environment for Statistical Computing.

Schneider C.A., Rasband W.S. & Eliceiri K.W. (2012) NIH Image to ImageJ: 25 years of image analysis. *Nature Methods* **9**, 671–675.

**Table S1:** Analysis results on larval survival and body size and tail shape. Test statistic is χ2 for proportion of larvae, *F* for all others. Bold indicates statistical significance

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
|  | df | χ2 or *F* | *P* |
| Proportion larvae |  |  |  |
| Survival | 1 | 5.62 | **0.0177** |
| Treatment | 4 | 16.42 | **0.0025** |
| Body condition |  |  |  |
| Survival | 1 | 20.00 | **<0.0001** |
| Stage | 1 | 37.46 | **<0.0001** |
| Treatment | 4 | 5.92 | **0.0013** |
| Mass |  |  |  |
| Survival | 1 | 11.31 | **0.0018** |
| Stage | 1 | 31.54 | **<0.0001** |
| Treatment | 4 | 5.10 | **0.0029** |
| Total length |  |  |  |
| Survival | 1 | 0.13 | 0.7223 |
| Stage | 1 | 2.71 | 0.1107 |
| Treatment | 4 | 1.38 | 0.2684 |
| Stage |  |  |  |
| Survival | 1 | 2.07 | 0.1592 |
| Treatment | 4 | 0.9480 | 0.4516 |

**Figure S1:** Average (a) larval survival to the end of the experiment and (b) body condition, (c) mass, (d) total length, and (e) Gosner stage per mesocosm of sampled larvae (means ± SE). Treatments are arranged the same as Fig. 2, and covariates are significant components of displayed results (see Table S1). NS indicates no significant differences.

