The maternal environmental effects of temperature on life history in *Arabidopsis thaliana*

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Maternal environment can influence the growth and fitness of offspring in plants. These effects on offspring life history can influence selection and thus evolutionary trajectories. In this study, we analyzed maternal effects on the model annual plant *Arabidopsis thaliana*. Seeds from twelve different naturally occurring lines across a broad latitudinal range were grown at two temperatures (18°C and 26°C) in growth chambers. We planted the offspring of these plants in a growth chamber at 18°C and recorded life history traits (bolting day, lifespan, rosette diameter, height, number of fruits, total seed mass, above-ground biomass). In addition, we performed a germination study using twenty seeds from each of the mothers originally grown at 18°C and 26°C. The data were analyzed using an ANOVA with temperature, line, and their interaction. One line was removed from the analysis due to poor survivorship and germination. We found that line significantly affected rosette diameter (p<.0001), the number of fruits (p=.0002), total seed weight (p<.0001), stem height (p<.0001), and the average germination day (p<.0001), but only marginally affected biomass (p=.0479). Maternal environment (18°C or 26°C) significantly affected the average germination day (p<.0001), but did not significantly affect any of the other life history characters examined. The interaction between line and maternal environment significantly affected the total number of fruits (p=.0084), rosette diameter (p=.0294), and the average germination day (p<.0001), but did not significantly affect the total seed mass, biomass, or stem height. Plants whose mothers were grown at the higher temperature germinated earlier and had more fruits, but exhibited the same final fitness (total seed mass and biomass). Our results suggest that the temperature of maternal environment can influence the proximal traits of offspring but does not affect their final reproductive potential.