What does egg size tell us about development and hatching time in *Heterocypris incongruens*?

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Colonisation of ephemeral ponds requires adaptations in life history and in hatching phenology: organisms must take advantage of ponds filling and "hedge their bets" for the possibility to complete their life cycle and produce resting stages that ensure that the population will not go extinct. The timing of many phenological events (e.g. egg hatching, beginning of development phases and reproduction) results from a complex interplay among organism genotype, environmental factors (e.g. temperature and photoperiod) and maternal effects. The relationship between egg size and development time is known and it is generally accepted that larger eggs take longer to develop than smaller ones. The production of eggs with variable size may represent a strategy by which

a mother spread the risk connected with life in a temporary habitat. In laboratory experiments carried out at 24 °C, we evaluated the effect of egg size on egg development time in a clonal lineage of *Heterocypris incongruens* typical of Northern Italy vernal pools. The lack of genetic variation expected among clonal organisms make them ideal material for investigating maternal effect (e.g. the environment the mother experienced). We measured the size of 50 eggs released at 12:12 L:D photoperiod, chosen as a proxy of favourable but unpredictable late winter-spring conditions, and 62 eggs at 16:8 L:D photoperiod, proxy of incoming a dry predictably unfavourable season inducing resting egg production. Each egg was identified, photo recorded, measured at different times from deposition for at least 200 days, for a total of 1841 measurements. At deposition, mean diameter was smaller in eggs released at 16:8 L:D (129.9 µm sd 7.69) than at 12:12L:D (133.1 µm sd 8.46) and, as expected, hatching percentage decreased from 52% at 12:12 L:D to 27% at 16:8 L:D. Egg diameter did not differ between resting (130.4 µm sd 8.13) and non resting eggs (133.0 µm sd 8.09) and did not affect hatching time that was highly variable (from 2 to 100 days) but did not vary with photoperiod. During our observation time, egg diameter increased 1.09-1.14 times following an asymptotic model. Size increment was higher (and slower) in eggs produced at 16:8 L:D than in eggs produced at 12:12 L:D. It was highly variable especially in resting eggs produced at 12:12 L:D, and was linked to the initial growth that occurred within 0-3 days from deposition. Our preliminary data show that, in *H. incongruens,* the egg size at deposition is affected by the environment the mother experienced*,* hatching time is not affected by egg size at deposition and early embryo developmental process occurs in resting eggs whose number of cells is about one hundred.