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DISSERTATION TITLE: *Life history traits and thermal adaptation in* Folsomia quadrioculata *(Collembola) across climatic regions.*

Life history traits are closely linked to fitness and populations of the same species compared under identical conditions are therefore expected to reflect adaptation to climates at their sites of origin. Life history traits are interlinked and evolve together as strategies, which often complicate evolutionary interpretations of population specific differences in single traits. Collembola are important components of the soil ecosystem and several species are widely distributed. Understanding adaptive differences in their life history strategies is important for predicting effects of climate change on the terrestrial ecosystem, but studies comparing conspecific populations from different climate regions are scarce.

This dissertation is based on life history strategies of the soil dwelling Collembola *Folsomia quadrioculata* which dominates different habitats across climate zones from high arctic to mild temperate regions. Temperature responses of several life history traits have been compared across a number of populations to understand whether success of this species can be attributed to its ability to adapt to different climates or to wide thermal tolerance range.

Large genotypic differences among populations were found in all the traits studied. Some traits showed significant, but small effects of latitude and macroclimate, but populations from close lying sites or similar climates often showed distinct differences. The magnitude of temperature effects (phenotypic plasticity) differed among populations and among traits. Number and size of offspring were the only traits that showed strong negative correlation.

Effects of latitude and macroclimate were largely masked by local conditions. Soil temperature, degree of predictability and seasonality appeared to be significant determinants of life history strategies. This work shows that a suitable experimental

framework to compare multiple life history traits across several populations can be a potent tool for revealing key drivers of thermal adaptation. Genetic relatedness and phenology (seasonal patterns in life cycle) of populations from distant and close lying sites deserve attention in future research.