



Developmental staging scheme of the ant *Monomorium pharaonis*: a potential new model for developmental biology

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Recent advances in genetically manipulation technology and its application in eusocial insect species through mutagenesis and transgenesis have opened exciting lines of research where gene function and regulatory networks can be explored with unprecedented resolution. Such functional and molecular studies, however, require a thorough understanding of both the timing of expression of genes of interest, and how this profile may change through time. This is particularly true for those genes involved in early development, where specific, tightly-regulated sets of genes are responsible for embryo formation and organization. Most knowledge of the function and expression of genes in embryonic development is based on classical insect model organisms, such as *Drosophila melanogaster* or *Tribolium castaneum*, yet we lack an equivalent model for the study of social insect development. Here, we propose the highly invasive ant *Monomorium pharaonis* as an ideal model for the study of embryonic development in ants. This species presents several advantages for use in developmental biology: it has a short generation time, and can be reared and crossed in laboratory conditions indefinitely with relative ease. We further provide a detailed embryonic developmental schedule and staging scheme for this species into which future molecular experimental findings can be placed, thereby providing a standardized context that can be used to illuminate fundamental questions in social insect development.