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Overview: Evolution of advanced eusociality via maternal manipulation

A notoriously extreme form of sociality is historically called advanced eusociality, where reproductives are extremely fertile and non-reproductives have highly specialized behavior or morphology. The evolution of advanced eusociality is currently explained by secondary evolution of coercion that reduces within-colony conflict which in turn favors within-colony cooperation. Here I present a model in which advanced eusociality alternatively evolves via maternal manipulation passing from a stage of conflict to one of no conflict. Maternal manipulation induces offspring to stay in the maternal site against offspring's fitness interests. Even though this creates selection pressure for resistance to manipulation, maternal manipulation also creates selection pressure for enhanced maternally controlled benefits (i.e., the mother is selected to capitalize more and more on the help available). An interpretation of maternally controlled benefits is as maternal extra fertility, which is shown to evolve to a point where Hamilton's rule is eventually satisfied. Thus, maternally manipulated helping can be stabilized in the long run by eliminating selection for resistance because of the evolution of extreme maternal fertility. Maternal manipulation can, therefore, account for two major features of advanced eusociality: non-conflictive social determination of reproductive status and extreme fertility in reproductives.