Male gametocyte fecundity and sex ratio of a malaria parasite

Allison T. Neal

University of Vermont Department of Biology

Evolutionary theory predicts that the sex ratio of *Plasmodium* gametocytes will be determined by number of gametes produced per male gametocyte (male fecundity), parasite clonal diversity and any factor that reduces the male gametes' ability to find and combine with female gametes. Despite the importance of male gametocyte fecundity for sex ratio theory as applied to malaria parasites, few data are available on gamete production by male gametocytes. In this study, exflagellating gametes, a measure of male fecundity, were counted for 866 gametocytes from 26 natural infections of the lizard malaria parasite, *Plasmodium mexicanum*. Maximum male fecundity observed was 8, but most gametocytes produced 2-3 gametes, a value consistent with the typical sex ratio observed for *P. mexicanum*. Fecundity and sex ratio were correlated (more female gametocytes with higher fecundity) as predicted by theory. Male fecundity was not correlated with gametocyte size, but differed among single-clone infections, suggesting genetic variation for fecundity. Male gametocytes in infections with higher gametocytaemia produced fewer gametes. Results agree with evolutionary theory, but also suggest a possible tradeoff between production time and number of gametes produced, which could explain the low fecundity of this species, the variation among infections, and the correlation with gametocytaemia.