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Contribution of adult sex ratio to trauma and reproductive output in large breeding groups of rhesus macaques (*Macaca mulatta*)

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Abstract

Maintaining stable breeding groups of rhesus macaques (*Macaca mulatta*) can be challenging due to the complex social dynamics and despotic nature of the species. Trauma from aggression is a common problem in rhesus colonies and can cause social disruption, strain veterinary and animal management resources, and potentially affect reproduction. Previous research has shown that increasing the number of non-natal adult males in a breeding group can improve group stability, reduce trauma, and increase reproduction. Here, we used mixed-effects regression models to examine the effects of sex ratio and other factors on trauma and reproduction at the Yerkes National Primate Research Center using a historical dataset made up of four large rhesus groups over an eleven-year period (2003–2013). As expected, sex ratio was a significant predictor for both trauma and reproduction. However, group age since formation was a stronger predictor of trauma frequency and the amount of space available was a slightly better predictor of reproduction than sex ratio or trauma. These results indicate that improving sex ratios can be a viable management strategy to reduce trauma and improve reproduction, particularly when it is difficult to manipulate the group compositions and/or their housing situations. Reducing trauma is a primary goal for rhesus breeding colonies, as it directly impacts the monkeys' health and psychological well-being. Such improvements are necessary for the ethical treatment and care of the animals themselves, but also to reduce financial burdens and maintain a healthy colony for research purposes.

Keywords: animal welfare, reproduction, rhesus macaque, sex ratio, social stability, trauma